

THE  
AMERICAN PHILOSOPHICAL SOCIETY

HELD AT PHILADELPHIA  
FOR PROMOTING USEFUL KNOWLEDGE

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YEAR BOOK 1943

JANUARY 1, 1943 – DECEMBER 31, 1943

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THE AMERICAN PHILOSOPHICAL SOCIETY  
INDEPENDENCE SQUARE  
PHILADELPHIA  
1944





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# I

## CHARTER \*

STATUTES AT LARGE OF PENNSYLVANIA

### CHAPTER DCCCXCIV.

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#### AN ACT

for incorporating the American Philosophical Society held  
at Philadelphia for promoting useful knowledge.

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**Whereas** the cultivation of useful knowledge, and the advancement of the liberal arts and sciences in any Country, have the most direct tendency towards the improvement of agriculture, the enlargement of trade, the ease and comfort of life, the ornament of society, and the increase and happiness of mankind; **And whereas** this country of North America, which the goodness of Providence hath given us to inherit, from the vastness of its extent, the variety of its climate, the fertility of its soil, the yet unexplored treasures of its bowels, the multitude of its rivers, lakes, bays, inlets, and other conveniences of navigation, offers to these United States one of the richest subjects of cultivation, ever presented to any people upon earth; **And whereas** the experience of ages shows that improvements of a public nature, are best carried on by societies of liberal and ingenious men, uniting their labours, without regard to nation, sect or party, in one grand pursuit, alike interesting to all, whereby mutual prejudices are worn off, a humane and philosophical spirit is cherished, and youth are stimulated to a laudable diligence and emulation in the pursuit of wisdom; **And whereas**, upon these principles,

\* Original Charter, Granted in 1780. Articles of Amendment added 1935.

divers public-spirited gentlemen of Pennsylvania and other American States did heretofore unite themselves, under certain regulations, into one voluntary Society, by the name of "The American Philosophical Society held at Philadelphia, for promoting useful knowledge," and by their successful labours and investigations, to the great credit of America, have extended their reputation so far, that men of the first eminence in the republic of letters in the most civilized nations of Europe have done honour to their publications, and desired to be enrolled among their members; **And whereas** the said Society, after having been long interrupted in their laudable pursuits by the calamities of war, and the distresses of our Country, have found means to revive their design, in hopes of being able to prosecute the same with their former success, and being further encouraged therein by the public, for which purpose they have prayed us, "the Representatives of the Freemen of the Commonwealth of Pennsylvania," that they may be created One Body Politic and Corporate forever, with such powers, privileges, and immunities, as may be necessary for answering the valuable purposes which the said Society had originally in view.

**Wherefore**, in order to encourage the said Society in the prosecution and advancement of all useful branches of knowledge, for the benefit of their country and mankind.

[SECTION I.] **Be it enacted, and it is hereby enacted by the Representatives of the Freemen of the Commonwealth of Pennsylvania, in General Assembly met, and by the authority of the same, That the Members of the said American Philosophical Society heretofore voluntarily associated for promoting useful knowledge, and such other persons as have been duly elected Members and Officers of the same, agreeably to the fundamental laws and regulations of the said Society, comprized in twelve sections, prefixed to their first volume of transactions, published in Philadelphia by William and Thomas Bradford in the year of our Lord one thousand seven hundred and seventy-one, and who shall in**

all respects conform themselves to the said laws and regulations, and such other laws, regulations and ordinances, as shall hereafter be duly made and enacted by the said Society, according to the tenor hereof, be and forever hereafter shall be, One Body Corporate and Politic in Deed, by the name and style of "The American Philosophical Society held at Philadelphia, for promoting useful knowledge," and by the same name they are hereby constituted and confirmed One Body Corporate and Politic, to have perpetual succession, and by the same name they and their successors are hereby declared and made able and capable in law, to have, hold, receive, and enjoy lands, tenements, rents, franchises, hereditaments, gifts, and bequests of what nature so ever, in fee simple or for term of life, lives, years or otherwise, and also to give, grant, let, sell, alien, or assign the same lands, tenements, hereditaments, goods, chattels, and premises, according to the nature of the respective gifts, grants, and bequests, made to them the said Society, and of their estate therein. **Provided**, that the amount of the clear yearly value of such real estate do not exceed the value of ten thousand bushels of good merchantable wheat.

[SECTION II.] **And be it further enacted by the authority aforesaid**, That the said Society be, and shall be for ever hereafter able and capable in law to sue, and be sued, plead and be impleaded, answer and be answered unto, defend and be defended in all or any of the courts or other places, and before any Judges, Justices, and other person or persons, in all manner of actions, suits, complaints, pleas, causes, and matters, of what nature or kind so ever, within this Commonwealth; and that it shall and may be lawfull to and for the said Society, for ever hereafter to have and use one common seal in their affairs, and the same at their will and pleasure to break, change, alter and renew.

[SECTION III.] **And be it further enacted by the authority aforesaid**, That for the well governing of the said Society, and ordering their affairs, they shall have the following officers, that is to say, one Patron, who shall be his

Excellency the President of the Supreme Executive Council \* of this Commonwealth, for the time being, and likewise one President, three Vice Presidents, four Secretaries, three Curators, one Treasurer, together with a Council of twelve members; and that on the first Friday of January next, between the hours of two and five in the afternoon, as many of the members of the said Society as shall have paid up their arrears due to the Society, and shall declare their willingness to conform to the laws, regulations and ordinances of the Society then duly in force, according to the tenor hereof, by subscribing the same, and who shall attend in the Hall or place of meeting of the said Society, within the time aforesaid, shall chuse by ballot, agreeable to the fundamental laws and regulations herein before referred to, one President, three Vice Presidents, four Secretaries, three Curators, and one Treasurer, and at the same time and place, the members met and qualified as aforesaid shall in like manner chuse four members for the Council, to hold their offices for one year, four more members for the Council to hold their offices for two years, and four more members for the Council, to hold their offices for three years. And on the first Friday in January, which shall be in the year of our Lord one thousand seven hundred and eighty-two, and so likewise on the first Friday of January, yearly and every year thereafter, between the hours of two and five in the afternoon, the Members of the said Society met and qualified as aforesaid, shall chuse one President, three Vice Presidents, four Secretaries, three Curators and one Treasurer, to hold their respective offices for one year, and four Council Men to hold their offices for three years, *Provided* that no person residing within the United States shall be capable of being President, Vice President, Secretary, Curator, Treasurer, or member of the Council, or of electing to any of the said offices, who is not capable of electing and being elected to civil offices within the State in which he resides. *Provided also*, that nothing herein

\* [Now His Excellency the Governor of this Commonwealth.]

contained shall be considered as intended to exclude any of the said Officers or Councillors, whose times shall be expired, from being re-elected, according to the pleasure of the said Society; and of the day, hours and place of all such elections, due notice shall be given by the Secretaries, or some one of them, in one or more of the public newspapers of this State, agreeable to the said fundamental laws and regulations before referred to.

[SECTION IV.] **And be it further enacted by the authority aforesaid,** That the Officers and Council of the said Society shall be capable of exercising such power for the well governing and ordering the affairs of the Society, and of holding such occasional meetings for that purpose, as shall be described, fixed, and determined by the statutes, laws, regulations and ordinances of the said Society, hereafter to be made. *Provided always,* that no statute, law, regulation or ordinance shall ever be made or passed by the said Society, or be binding upon the members thereof, or any of them, unless the same hath been duly proposed, and fairly drawn up in writing, at one stated meeting of the Society, and enacted or passed at a subsequent meeting at least the space of fourteen days after the former meeting, and upon due notice in some of the public newspapers, that the enacting of statutes and laws, or the making and passing ordinances and regulations, will be part of the business of such meeting; nor shall any statute, law, regulation or ordinance be then or at any time enacted or passed, unless thirteen members of the said Society, or such greater number of members as may be afterwards fixed by the rules of the Society, be present, besides such quorum of the Officers and Council, as the laws of the Society for the time being may require, and unless the same be voted by two-thirds of the whole body then present; all which statutes, laws, ordinances and regulations, so as aforesaid duly made, enacted and passed, shall be binding upon every member of the said Society, and be from time to time inviolably observed, according to the tenor and effect thereof; pro-

vided they be not repugnant or contrary to the laws of this Commonwealth, for the time being in force and effect.

**And whereas** nations truly civilized (however unhappily at variance on other accounts) will never wage war with the Arts and Sciences, and the common Interests of humanity:

[SECTION V.] **Be it further enacted by the authority aforesaid,** That it shall and may be lawful for the said Society by their proper officers, at all times, whether in peace or war, to correspond with learned Societies, as well as individual learned men, of any nation or country, upon matters merely belonging to the business of the said Society, such as the mutual communication of their discoveries and proceedings in Philosophy and Science; the procuring books, apparatus, natural curiosities, and such other articles and intelligence as are usually exchanged between learned bodies, for furthering their common pursuits; **Provided always,** That such correspondence of the said Society be at all times open to the inspection of the Supreme Executive Council of this Commonwealth.

[Signed]

*JOHN BAYARD,*  
*Speaker.*

**Enacted into a Law at Philadelphia on Wednesday the fifteenth day of March anno Domini one thousand seven hundred and eighty.**

[Signed]

*THOMAS PAINE,*  
*Clerk of the General Assembly.*



COMMISSION FOR THE COMPILATION OF THE LAWS  
OF PENNSYLVANIA PRIOR TO 1800.

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CLERK'S OFFICE,  
1211 BETZ BUILDING.

JAMES T. MITCHELL, }  
HENRY FLANDERS, } *Commissioners.* CHAS. R. HILDEBURN, *Clerk.*

PHILADELPHIA, March 12, 1898.

Compared, revised and found to be a correct copy of the original enrollment in the archives of the Commonwealth, by me the custodian of the said original as clerk of the commissioners appointed under the act of May 19, 1887, entitled, AN ACT FOR THE COMPILATION AND PUBLICATION OF THE LAWS OF THE PROVINCE AND COMMONWEALTH OF PENNSYLVANIA PRIOR TO THE YEAR ONE THOUSAND EIGHT HUNDRED, P.L. 1887, pp. 129 and 130.

CHAS. R. HILDEBURN,  
*Clerk of the Commissioners.*

Witness as to Chas. R. Hildeburn:

WM. NEWBOLD ELY,  
JULIUS F. SACHSE.



Sworn to and subscribed before me  
this 19th day of May, 1898.

JAMES P. STERRETT,  
*Chief Justice of the Supreme Court  
of Pennsylvania.*

## ARTICLES OF AMENDMENT

## ARTICLE I

Notwithstanding the Proviso at the end of the first paragraph following the preamble of this Charter, or any other proviso thereof, the Society shall have the capacity and authority without limitation by this Charter to purchase, take, receive, lease as lessee, take by gift, devise or bequest, or otherwise acquire, and to own, hold, use, and otherwise deal with any and all real or personal property, or any interest therein, wherever situated.

## ARTICLE II

Any provisions of this Charter which are purely administrative in their nature, including those concerning the officers, the members of the council, and the date and time of meetings, may be altered by a law, regulation or ordinance of the Society duly adopted and not repugnant or contrary to the laws of this Commonwealth.

## CERTIFICATE OF ACCEPTANCE

1. The name of the accepting corporation is The American Philosophical Society held at Philadelphia for promoting useful knowledge.

2. The American Philosophical Society was created by the Act of Assembly approved March 15, 1780, L.B. No. 1, 363.

3. The American Philosophical Society herewith accepts the Constitution of Pennsylvania and the provisions of the Nonprofit Corporation Law.

4. The acceptance made herewith was duly authorized by a meeting of the members called for that purpose, held in Philadelphia on the 6th day of December, 1935.

ROLAND S. MORRIS  
*President*

C. F. SKINKER  
*Assistant Secretary*



Filed this 12th day of  
December, 1935

J. WARREN MICKLE

Deputy Secretary of the Commonwealth

Recorded in

Miscellaneous Corporation

Record Book 210, P. 125

## II

### LAWS

(As Amended April 24, 1936, April 22, November 19, 1938,  
November 18, 1939, November 21, 1942, and  
April 23, 1943)

#### CHAPTER I

*Of the Members both resident and foreign: their classification, nomination, and election; suspension and forfeiture of membership.*

ART. 1. The resident members of the Society are elected from among citizens or residents of the United States who have achieved distinction in the sciences or humanities, in letters, in the practice of the arts or of the learned professions, or in the administration of affairs. Their number may not exceed five hundred, nor may more than thirty be elected in any one year.

ART. 2. The foreign members of the Society are elected from among persons who are neither citizens nor residents of the United States, and who are of the greatest eminence for their attainments in science, letters, or the liberal arts. Their number may not exceed sixty, nor may more than eight be elected in any one year.

ART. 3. Every member, whether resident or foreign, shall be classified according to his expressed wishes, or in accordance with his principal activities or contributions to knowledge, in one of the following four classes: \*

\* In accordance with general usage, the following more or less clearly defined fields of science and learning within the four classes have been recognized by the Society in recent years: Class I. Mathematics; Astronomy; Physics; Chemistry; Engineering. Class II. Geology, Paleontology, Geography; Zoology, Anatomy; Botany, Bacteriology; Anthropology, Psychology; Physiology, Pathology; Medicine, Pharmacology, Surgery. Class III. Political Science, Economics, Statistics and Sociology; Modern History; Jurisprudence; Administration, Government; Affairs. Class IV. Philosophy, Education; Ancient, Medieval and Cultural History; Archaeology, History of Art, Architecture; Literary History; Languages; Letters, Fine Arts.

- Class I. Mathematical and Physical Sciences
- Class II. Geological and Biological Sciences
- Class III. Social Sciences
- Class IV. Humanities

ART. 4. In each of the four classes of members there shall be a Committee on Membership consisting of a Chairman and four other members, appointed by the President.

ART. 5. Nominations to membership shall be made in writing by the Committees on Membership, or they may be made by any five members of the Society. These nominations shall be known respectively as "Committee nominees," and "Member nominees," and shall be so listed in the *preliminary ballot*. These nominations must be in the Executive Office before December first. Nominations shall be on blank forms provided for that purpose and shall specify the qualifications and principal activities or fields of learning of the nominees. In case of non-election nominations may be continued by the written endorsement of three of the proposers filed in the Executive Office before November first following and shall be listed as "Continued nominations" in the *preliminary ballot*; these nominations may be continued a second time in similar manner, after which the names of the unsuccessful candidates will be dropped and all papers relating thereto destroyed. Such candidates may be considered again only by entirely new nominations.

ART. 6. Immediately after December first in each year the Chairman of each Committee on Membership shall submit to the members of his class a list of all the nominations in the class and shall request them to use this list as a *preliminary ballot* and to check on it the names of those persons, not more than twelve in number, whom they prefer for resident members, and not more than five whom they prefer for foreign members, and to sign and return this ballot to the Executive Office before January first.

ART. 7. Before February first each Committee on Membership shall select from among those nominees having a

high number of votes in the *preliminary ballot* not more than twelve for resident membership and not more than five for foreign membership in each class, due regard being given to a proper representation of the various subjects within the class.

ART. 8. Before February first, the Council may nominate not more than three persons in each year whose names shall be presented to the Society in the *preference ballot* as "Council nominees" together with their qualifications. These nominations shall be on the regular blank forms provided for that purpose.

ART. 9. It shall be the duty of each Committee on Membership to prepare, with such outside assistance as it may choose, a brief biographical sketch of each of the nominees so selected, listing his profession, position, qualifications, and important publications or contributions to science, literature, art or affairs. The names of these nominees, together with the biographical sketch of each, shall then be printed in alphabetical order under each class, and shall be sent confidentially to all members of the Society not later than March first. Members shall be invited to return to the Executive Office before April first a *preference ballot* on which they have checked the names of not more than thirty nominees for resident membership and of not more than eight for foreign membership.

ART. 10. The Council at the meeting next preceding the General Meeting of the Society in the month of April, notice of which shall be given at least two weeks in advance, shall select by ballot from the list of nominees residing within the United States a number not exceeding thirty, and of non-residents of the United States a number not exceeding eight, to be recommended to the Society for election. In this selection special weight shall be given to the votes of members in the preference ballot. The names of the nominees so chosen, arranged alphabetically in classes, shall be reported to the Society at its next ensuing session.

ART. 11. Election to membership, both resident and foreign, shall be by ballot at the General Meeting of the Society in the month of April. A two-thirds vote of those present and voting shall be necessary to elect.

ART. 12. The members are mutually pledged not to mention to non-members of the Society the name of any nominee proposed, or of any withdrawn or unsuccessful nominee.

ART. 13. Every person who is elected a resident or foreign member shall signify his acceptance in writing within one year after the mailing of notification of such election. In default of such acceptance the election shall be void.

ART. 14. The formal admission of a member into the Society shall be at his first attendance at a meeting of the Society after his election and in the manner and form following: He shall subscribe the Laws in the Roll Book and be introduced to the President, who, taking him by the hand, shall say:

*“By the authority and in the name of the American Philosophical Society held at Philadelphia for Promoting Useful Knowledge, I do admit you a Member thereof.”*

ART. 15. The Society may from time to time assess membership dues in accordance with its needs and policies. Any person who shall refuse or neglect to pay such assessment for two years, after two or more notifications from the Treasurer, shall be reported to the Society as delinquent and his name shall be stricken from the roll of members.

ART. 16. The membership of any resident or foreign member may, for good and sufficient cause, and upon recommendation by the Council, be terminated by the Society at a General Meeting by a vote of two-thirds of the members attending, provided, however, that the total number of members so attending shall be not less than thirty.

## CHAPTER II

*Of the Patron and Elective Officers; qualifications, nominations and elections, terms of office, suspension or removal, vacancies.*

ART. 1. The Governor of Pennsylvania shall be ex-officio the Patron of the Society.

ART. 2. The elective Officers of the Society shall be a President, three Vice-presidents, two Secretaries, a Curator, a Treasurer, and twelve Councillors.

ART. 3. No person save the Treasurer, who may be a Corporation, shall be capable of holding any elective office as defined above, who is not a citizen of the United States.

ART. 4. Nominations to the elective offices of the Society are made by the Committee on Nominations as herein-after provided, and may also be made by petition signed by not less than twenty members, in such manner as may be prescribed by the Committee on Nominations and approved by the Council.

ART. 5. The election of Officers shall be held at the General Meeting in the month of April at a time duly announced in the program. The election shall be by ballot, a majority of all ballots cast being requisite for election. In the event that no candidate for a given office shall receive such a majority, a second ballot shall be taken and election shall be by plurality of votes cast.

ART. 6. The terms of all elective Officers, except Councillors, are of one year, commencing upon the close of the General Meeting at which they are elected. They shall serve until the election and acceptance of their successors and are eligible for reelection.

ART. 7. The terms of Councillors are of three years, commencing upon the close of the General Meeting at which they are elected. They shall serve until the election and acceptance of their successors, but are ineligible for reelection until one year after the expiration of their terms of office.

ART. 8. Any elective Officer may be suspended or removed from office, for good and sufficient cause, at a meeting of the Council, by a vote of two-thirds of all its members.

ART. 9. A vacancy occurring in any elective office may be filled for the unexpired term by vote of a majority of the Council.

### CHAPTER III

#### *Of the Officers and their duties*

ART. 1. The PRESIDENT shall preside at the meetings of the Society and Council; he shall appoint all committees, and designate their chairmen, except as otherwise provided in the Laws, and shall be ex-officio a member of all committees except the Committee on Nominations.

ART. 2. The VICE-PRESIDENTS shall preside at meetings of the Society and Council, in the absence of the President, in rotation in order of seniority of continuous service. In the event of the death or disability of the President, the senior Vice-president shall act as President until the vacancy shall be filled.

ART. 3. The SECRETARIES shall have the custody of the Seal of the Society, shall record the proceedings of the Society and the Council, shall notify all acts of the Society and the Council to those concerned, shall conduct the correspondence of the Society and Council, shall maintain the authentic list of resident and foreign members, and shall have the custody of the Society's files and records. The Secretaries shall arrange among themselves each year as to the distribution and performance of their duties, and shall report such arrangement to the Council; they shall also have power to delegate the performance of their duties to the Assistant Secretary or Executive Officer.

ART. 4. The CURATOR shall have charge of the Cabinet, and shall supervise the maintenance, exhibit, and use of the Society's collections, and shall advise the Council with



respect to their increase, disposal, or temporary loan. He shall be ex-officio a member of the Committee on the Hall.

ART. 5. The TREASURER may be a person, as defined in Chap. II, Art. 3, or a trust company or other suitable financial corporation of the State of Pennsylvania. He shall collect and receive all moneys due or payable to the Society or entrusted to its care, and all gifts and bequests made to it. He shall pay all bills due by the Society when properly approved, in accordance with appropriations authorized by the Society or the Council, or in accordance with the terms of trust funds established for specific purposes. He shall deposit the funds and securities of the Society in its name with such banks or trust companies in the State of Pennsylvania as may be approved by the Committee on Finance.

ART. 6. The Treasurer shall keep accounts in good and regular order of all receipts and expenditures and of all moneys or other property in his hands, and shall report them, and present them for audit, as may be required by the Committee on Finance.

ART. 7. The Treasurer may, if authorized by vote of the Committee on Finance, employ an assistant treasurer or a trust company or other suitable financial corporation of the State of Pennsylvania, approved by the Committee on Finance, for the performance of such duties as may be delegated to such agent.

ART. 8. The Treasurer shall give bond, at the expense of the Society, for the faithful execution of all his trusts, in such amount as may be required by the Committee on Finance.

ART. 9. The Treasurer shall, upon the expiration of his term of office, deliver over to the Committee on Finance, for transmittal to his successor, the books, papers, moneys, and property remaining in his hands.

ART. 10. No elective office in the Society except that of Treasurer shall carry any salary, but officers may be reimbursed for any necessary expenditures made in the performance of their duties.

## CHAPTER IV

*Of the Council and the Annual Budget*

ART. 1. The COUNCIL shall consist of the Officers, the twelve Councillors, and the Chairmen of the Committees on Finance, Research, Publications, Library and Hall.

ART. 2. The Council shall hold at least two meetings a year, and nine members shall constitute a quorum at any meeting, provided, however, that for the adoption of the budget a vote of a majority of all the members shall be requisite. Minutes of the proceedings and acts of the Council shall be regularly kept.

ART. 3. The Council shall make recommendations for membership in the Society as provided in Chap. I, Art. 9, of the Laws, and elect members of the Committees on Research and Publications as provided in Chap. 5, Arts. 5 and 8.

ART. 4. The Council shall, at such time as they may fix, ask all Committees to submit estimates of their needs for the ensuing fiscal year which, together with the report of receipts and expenditures by the Committee on Finance, shall be made the basis for the annual budget to be submitted by the Council to the Society for its approval at the General Meeting in April or November.

ART. 5. The Council shall have power to take action for the Society in legal matters, to manage its affairs, and to assume its administration, to make contracts or to authorize them to be made in the name of the Society, except as otherwise provided.

ART. 6. The Council shall require reports to be presented to it at least once a year by such officers, committees, and employees of the Society as they may designate, or as may be required by the Laws to present such reports, and shall, through the President, present an annual report to the Society on the state of its affairs.

ART. 7. The Council shall have power to appoint an administrative Executive Officer, and to fix his term of service, duties and compensation.

## CHAPTER V

*Of the Committees of the Society*

ART. 1. There shall be four COMMITTEES ON MEMBERSHIP, one in each class, each composed of five members whose appointment and duties are prescribed in Chap. I, Arts. 4-8.

ART. 2. There shall be a COMMITTEE ON FINANCE, consisting of the President and Treasurer, ex-officio, and not fewer than five other members who shall be nominated by the President and elected by the Society at the General Meeting in April. A majority of the Committee shall constitute a quorum at any meeting. The Committee shall keep a record of all its acts and proceedings, which shall be communicated to the Council.

ART. 3. The Committee on Finance shall have the general superintendence of the financial concerns of the Society. It shall have the custody and control of all the securities and investments of the Society, both real and personal, with full power and authority to buy and to sell, and to invest and reinvest the same; including the power to purchase and to sell real estate and to make leases thereof, to satisfy mortgages and extinguish ground rents, and to direct the placing of all such insurances as it may deem necessary; as well as to borrow on the credit of the assets of the Society, to create mortgages thereon, and to make such improvements, repairs and alterations to real estate as it may deem necessary. It shall have power to authorize the proper Officers of the Society to execute the necessary papers to effect all purchases, sales and assignments of property, both real and personal; to execute and to satisfy mortgages, to extinguish ground rents and to transfer registered securities; to subscribe to bond-holders' agreements to plans of reorganization involving any securities held by the Society or in which it has an interest, and to do all such acts as are necessary in pursuance of the foregoing powers.

ART. 4. The Committee on Finance shall always have

access to the Treasurer's books, accounts, and vouchers, and shall cause an audit of such accounts to be made at least once a year. It shall require from the Treasurer an annual report of all the operations of the treasury, which it shall present to the Council with an annual statement of estimates of receipts and expenditures. With the approval of the Council it shall determine the fiscal year of the Society and, in case of emergency needs, authorize appropriations over and above the annual budget.

ART. 5. There shall be a COMMITTEE ON RESEARCH, consisting of the President, ex-officio, and of not fewer than six other members, representative of the four classes, who shall serve for three years and who shall be nominated by the President and elected by the Council. A majority of the Committee shall constitute a quorum at any meeting, and shall be requisite for any vote disposing of funds that may be allotted to the Committee. The Chairman, or a member designated by the Chairman, of the Committee on Publications, and of the Committee on Meetings, may sit with the Committee on Research but shall not vote.

ART. 6. The Committee on Research shall, with the approval of the Council, prescribe regulations for receiving and considering proposals for the advancement of knowledge through investigation. It may take such action as it shall see fit with respect to proposals received by it, and may, with the approval of the Council, itself initiate and cause to be executed investigations for the advancement of knowledge. It shall certify to the Treasurer all disbursements to be made from funds appropriated to it by the Council, and may allot therefrom such sums as it may see fit, on such conditions as it may prescribe, for the investigations approved by it. It shall require reports of the expenditures of all sums so allotted, and of the progress of all investigations aided thereby. It may withhold assistance in the event that the said reports are judged unsatisfactory.

ART. 7. The Committee on Research shall report all its acts to the Council, and from time to time submit reports

to the Society on the progress of the investigations aided by it, and on the contributions to the advancement of knowledge made by them.

ART. 8. There shall be a COMMITTEE ON PUBLICATIONS, consisting of the President, ex-officio, and of not fewer than six other members, representative of the four classes, who shall serve for three years, and who shall be nominated by the President and elected by the Council. A majority of the Committee shall constitute a quorum at any meeting, and shall be requisite for any vote disposing of funds that may be allotted to the Committee. The Chairman, or a member designated by the Chairman, of the Committee on Research and of the Committee on Meetings, may sit with the Committee on Publications but shall not vote.

ART. 9. The Committee on Publications shall supervise the contents, editing, printing, publication, distribution, and sale of all publications issued by the Society or in its name. It shall have power to employ necessary editorial assistance, and, with the approval of the Council, to appoint an Editor and to determine his duties and fix his compensation. It shall cause the necessary contracts for the manufacture of the Society's publications to be drawn up and executed. It shall certify to the Treasurer all bills which it shall have examined and approved for expenses attending the publications, as well as all disbursements to be made from funds appropriated to the Committee by the Council.

ART. 10. The Committee on Publications shall, with the approval of the Council, prescribe regulations for receiving and considering proposals for publication, and may take such action as it shall see fit with respect to proposals so received, including the allotment of funds appropriated to the Committee by the Council. The Committee shall have power to appoint referees or special sub-committees to assist it in the examination of material presented to it for publication and, in its discretion, to give honoraria for services so rendered. It shall report all its acts to the Council.

ART. 11. There shall be a COMMITTEE ON MEETINGS, consisting of the President, ex-officio, and of not fewer than four other members representative of the four classes. The Committee shall be appointed by the President and shall have power to add to its numbers. A majority of the Committee shall constitute a quorum at any meeting and shall be requisite for any vote disposing of funds that may be allotted to the Committee. The Chairman, or a member designated by the Chairman, of the Committee on Research and of the Committee on Publications, may sit with the Committee on Meetings but shall not vote.

ART. 12. The Committee on Meetings shall be charged with the preparation of the scientific and scholarly programs of all meetings of the Society, and of all meetings held under its auspices, and with the organization of discussions, symposia, and conferences. It shall have power to name special sub-committees to assist it, and to invite suitable persons, whether members of the Society or not, to participate in such programs, discussions, symposia, etc. The Committee shall have power to use such funds as may be appropriated to it by the Council for defraying the expenses of the programs, discussions, etc., organized by it, and shall certify to the Treasurer all disbursements to be made from such funds.

ART. 13. The Committee on Meetings shall transmit to the Committee on Publications all papers, communications, reports, and other materials which it may recommend for publication.

ART. 14. There shall be a COMMITTEE ON LIBRARY, consisting of the President, ex-officio, and of not fewer than six other members, representative of the four classes, who shall serve for three years and who shall be appointed by the President.

ART. 15. The Committee on Library shall supervise the administration of the Library, and shall, with the approval of the Council, prescribe regulations for its government and use. The Committee shall have power, with the ap-

proval of the Council, to employ a Librarian, determine his duties, and fix his compensation. It shall have charge of the exchange of publications, and shall have power to expend income of trust funds established specifically for purposes of the Library. The Committee shall prepare estimates of expenditures for the maintenance and increase of the Library, and shall certify to the Treasurer all bills properly payable and all disbursements to be made from funds appropriated by the Council for the purposes of the Library.

ART. 16. There shall be a COMMITTEE ON HALL, consisting of the President and Curator, ex-officio, and such other members as may be appointed by the President. They shall serve for three years and shall have charge of the Hall of the Society and of its furniture and fixtures and shall direct all necessary repairs.

ART. 17. There shall be a COMMITTEE ON NOMINATION OF OFFICERS consisting of five members,—a Chairman, appointed by the President, and the four Councillors who are entering the third year of their term of service.

ART. 18. The Committee shall, not later than December first, invite all members of the Society to submit to it informal suggestions for nominations to all offices to be filled by election at the next General Meeting.

ART. 19. The Committee shall then communicate to all members of the Society, not later than March first, a report presenting one nomination to each office to be filled by election at the next General Meeting. Nominations may also be made by petition if signed by twenty or more members and submitted to the Chairman not later than March thirty-first. Notice of such nomination must be sent to all members by April first.

ART. 20. The Committee shall prepare for use in the elections at the General Meeting a ballot in which shall be included, under each position to be filled by election, the name of the Committee's nominee, and the names, in alphabetical order, of any nominees included in petitions duly received in accordance with the Laws.

## CHAPTER VI

*On the Meetings of the Society*

ART. 1. The Annual General Meeting shall be held in the month of April on days designated by vote of the Council, adopted at least three months before the date fixed therefor, at which it shall be lawful to transact all business not in contravention of the Laws.

ART. 2. The Autumn General Meeting shall be held on days designated by vote of the Council, usually in the month of November, at which it shall be lawful to transact all business not in contravention of the Laws.

ART. 3. Special meetings may be called at any time by order of the President, or, in his absence or disability, by order of a Vice-president, or by vote of the Council, for the consideration of matters of scientific or scholarly interest or for the transaction of such business as shall be specified in the order or vote calling the meeting.

## CHAPTER VII

*Of the Publications of the Society*

ART. 1. The publications of the Society shall consist of PROCEEDINGS, TRANSACTIONS, MEMOIRS, YEAR BOOK, and of such other serial or separate publications as may be authorized by the Council upon recommendation by the Committee on Publications.

ART. 2. The PROCEEDINGS shall contain papers that are read before the Society at its meetings and that have been approved by the Committee on Publications. Other papers from whatever source may also be published in the PROCEEDINGS if approved by this Committee. The PROCEEDINGS will be distributed without charge, as issued, to the members who request it.

ART. 3. The TRANSACTIONS shall consist of contributions in the form of monographs, treatises, collections of documents, and other materials, approved by the Committee on Publications. The TRANSACTIONS shall be issued in complete parts, one or more of which may constitute a volume.



They may be supplied to any member on such conditions or terms as may be prescribed by the Committee on Publications.

ART. 4. The MEMOIRS shall consist of works approved by the Committee on Publications. They shall be issued in such form as shall make possible their assembly in volumes according to subject matter, or to fields of knowledge. They may be supplied to any member on such conditions or terms as may be prescribed by the Committee on Publications.

ART. 5. The YEAR BOOK shall contain, among other items, the Charter and Laws, list of Officers and Committees, the annual report of the President and Officers, important acts of the Society and Council, reports of all standing Committees, a catalogue of prizes, premiums and lectureships, lists of all members together with those elected and those deceased during the year, and obituaries of deceased members. It shall be published as soon as possible after the close of each calendar year and shall be sent gratis to all members of the Society.

## CHAPTER VIII

### *Of the Laws of the Society and their Amendment*

ART. 1. No amendment or supplement to these laws, nor any new law shall be made or passed by the Society, unless the same has been duly proposed in writing at a Stated Meeting of the Society and enacted at the subsequent General Meeting; due notice of the proposed law or amendment having been sent by mail at least fourteen days before the said General Meeting to the members qualified to vote thereon.

ART. 2. At the General Meeting no amendment or supplement to these laws shall be made, nor shall any new law be made, unless there be present a quorum of at least twenty members, of whom not fewer than five shall be members of the Council, and the same be voted by two-thirds of the whole body present.



III  
OFFICERS AND COMMITTEES  
1943-1944

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OFFICERS

PATRON

THE GOVERNOR OF PENNSYLVANIA

PRESIDENT

EDWIN G. CONKLIN

VICE-PRESIDENTS

†FREDERICK P. KEPPEL   EDWARD P. CHEYNEY   THOMAS H. MORGAN

SECRETARIES

W. F. G. SWANN

ERNEST M. PATTERSON

CURATOR

JOHN STORY JENKS

TREASURER

FIDELITY-PHILADELPHIA TRUST COMPANY

EXECUTIVE OFFICER

LUTHER P. EISENHART

LIBRARIAN AND DIRECTOR OF PUBLICATIONS

WILLIAM E. LINGELBACH

COUNCILLORS

Elected in 1941	Elected in 1942	Elected in 1943
WILLIAM BELL DINSMOOR	CAMPBELL BONNER	ARTHUR B. COBLE
ROSS G. HARRISON	†DOUGLAS JOHNSON	HERBERT S. GASSER
HERBERT E. IVES	C. E. KENNETH MEES	EDMUND E. DAY
JOSEPH H. WILLITS	ROLAND S. MORRIS	FRANK AYDELOTTE

† Deceased.

## STANDING COMMITTEES

The President is *ex-officio* a member of all committees except the Committee on Nomination of Officers. The first member named in each committee is Chairman. The Executive Officer sits with all committees but does not vote unless regularly a member.

## FINANCE

(For one year, 1943-44)

MARSHALL S. MORGAN  
OLIVER E. BUCKLEY  
THOMAS S. GATES  
EDWARD HOPKINSON, JR.  
JOHN STORY JENKS  
NICHOLAS KELLEY  
ROLAND S. MORRIS  
CHARLES J. RHODES  
J. HENRY SCATTERGOOD

## HALL

(For three years)

JOHN STORY JENKS (1943-46)  
PAUL P. CRET (1942-45)  
LEICESTER B. HOLLAND (1942-45)  
FISKE KIMBALL (1943-46)  
MARSHALL S. MORGAN (1942-45)  
LAWRENCE J. MORRIS (1942-45)  
FRANCIS R. PACKARD (1941-44)  
JOHN M. SCOTT (1942-45)

## RESEARCH

(For three years)

LUTHER P. EISENHART (1942-45)  
WILLIAM F. ALBRIGHT (1942-45)  
DETLEV W. BRONK (1942-45)  
EDWARD P. CHEYNEY (1942-45)  
GILBERT CHINARD (1941-44)  
EUGENE F. DUBOIS (1942-45)  
FRANK A. FETTER (1942-45)  
ROLAND S. MORRIS (1942-45)  
HARLOW SHAPLEY (1942-45)  
EDMUND W. SINNOTT (1943-46)  
W. F. G. SWANN (1942-45)  
HUGH S. TAYLOR (1942-45)

## PUBLICATIONS

(For three years)

JACOB R. SCHRAMM (1941-44)  
LUTHER P. EISENHART (1942-45)  
WILLIAM K. GREGORY (1943-45)  
HENRY C. LANCASTER (1943-46)  
WILLIAM E. LINGELBACH (1942-45)  
FOREST R. MOULTON (1942-45)  
ARTHUR D. NOCK (1942-45)  
ERNEST M. PATTERSON (1941-44)  
CONYERS READ (1942-45)  
ADOLPH H. SCHULTZ (1942-45)  
ROBERT L. SCHUYLER (1943-46)  
T. LESLIE SHEAR (1942-45)  
HAROLD C. UREY (1941-44)

## MEETINGS

(For one year, 1943-44)

LUTHER P. EISENHART  
C. F. TUCKER BROOKE  
GEORGE W. CORNER  
KARL K. DARROW  
WILLIAM B. DINSMOOR  
WILLIAM E. LINGELBACH  
ERNEST M. PATTERSON  
WENDELL M. STANLEY  
JOSEPH H. WILLITS

## LIBRARY

(For three years)

WILLIAM E. LINGELBACH (1942-45)  
JULIAN P. BOYD (1943-46)  
GILBERT CHINARD (1943-46)  
GEORGE W. CORNER (1943-46)  
KARL K. DARROW (1943-46)  
J. PERCY MOORE (1943-46)  
HORACE C. RICHARDS (1942-45)  
A. S. W. ROSENBAACH (1941-44)  
ST. GEORGE L. SIOUSSAT (1942-45)  
CARL VAN DOREN (1943-46)

## COMMITTEES ON MEMBERSHIP

(For one year, 1943-44)

CLASS I. MATHEMATICAL  
AND PHYSICAL SCIENCES

HUGH S. TAYLOR  
GILBERT A. BLISS  
LEE A. DUBRIDGE  
JEROME C. HUNSAKER  
HARLOW SHAPLEY

CLASS II. GEOLOGICAL AND  
BIOLOGICAL SCIENCES

ROSS G. HARRISON  
ARTHUR F. BUDDINGTON  
WALTER S. HUNTER  
MERKEL H. JACOBS  
BURTON E. LIVINGSTON

## CLASS III. SOCIAL SCIENCES

ERNEST M. PATTERSON  
EDWARD S. CORWIN  
GUY STANTON FORD  
PHILIP C. JESSUP  
JOHN H. WILLIAMS

## CLASS IV. HUMANITIES

CAMPBELL BONNER  
EDWARD C. ARMSTRONG  
CARL W. BLEGEN  
C. F. TUCKER BROOKE  
MARJORIE H. NICOLSON

## COMMITTEE ON NOMINATION OF OFFICERS

(For one year, 1943-44)

ROLAND S. MORRIS, Chairman

WILLIAM BELL DINSMOOR

ROSS G. HARRISON

HERBERT E. IVES

JOSEPH H. WILLITS

} Retiring Councillors

## SPECIAL COMMITTEES

The first named in each Committee is Chairman.

BICENTENNIAL CELEBRATION OF THE BIRTH OF  
THOMAS JEFFERSON

ROLAND S. MORRIS  
GILBERT CHINARD  
FREDERIC A. DELANO  
SAMUEL A. MITCHELL

ST. GEORGE L. SIOUSSAT  
W. F. G. SWANN  
CHARLES WARREN  
THOMAS J. WERTENBAKER

**LEWIS PRIZE**

LUTHER P. EISENHART  
DETLEV W. BRONK  
GILBERT CHINARD

**MAGELLANIC PRIZE**

ROLAND S. MORRIS  
LYMAN J. BRIGGS  
HARVEY N. DAVIS  
HARLOW SHAPLEY

**EDITORIAL BOARD**

WILLIAM E. LINGELBACH, Editor  
Committee on Publications  
FRANCIS HARPER, Assistant to Editor

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**EXECUTIVE OFFICE STAFF**

LUTHER P. EISENHART, Executive Officer  
JULIA A. NOONAN, Assistant Secretary  
MELANIE BALASSA, Assistant in the Office

**LIBRARY STAFF**

WILLIAM E. LINGELBACH, Librarian  
GERTRUDE D. HESS, Assistant Librarian  
M. BARBARA O'NEILL, Restorer of Manuscripts  
RUTH A. DUNCAN, Assistant in the Library  
MARY C. DOTHARD, Stenographer  
ALBAN W. HOOPES, Archivist \*

\* Appointment terminated, June 30, 1943.

## IV

### MINUTES OF THE MEETINGS AND OF THE EXECUTIVE SESSIONS

#### 1. MIDWINTER MEETING, FEBRUARY 19, 20, 1943

The Midwinter Meeting program was devoted to the Symposium on Post-War Problems.

Sixty-four members and approximately fifty guests attended this meeting and ten papers were read.<sup>1</sup>

Winthrop J. V. Osterhout, James Bryant Conant, Wolfgang Köhler, and Warren Randolph Burgess, recently elected members, subscribed the Laws and were admitted into the Society.

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#### 2. ANNUAL GENERAL MEETING, APRIL 22, 23, 24, 1943

The first day of the Annual General Meeting and the Friday evening lecture were devoted to the Celebration of the Two Hundredth Anniversary of the Birth of Thomas Jefferson, third President of the Society, 1797-1815. Eleven papers dealing with various subjects were read at the subsequent sessions. On Saturday evening the Bicentennial Dinner in Celebration of Benjamin Franklin's Proposal, May 14, 1743, to Found the American Philosophical Society was held at the Bellevue-Stratford Hotel.

One hundred and twenty-three members and approximately one hundred guests attended the meeting.

The following recently elected members subscribed the Laws and were admitted into the Society during the course of the meeting: Joseph Quincy Adams, Carl L. Becker, Ira Sprague Bowen, Oliver Ellsworth Buckley, Leonard Carmichael, Eugene Floyd DuBois, Theodor von Kármán, Robert Raynolds McMath, Gisela Marie Augusta Richter, Lewis Hill Weed, and Harald Malcolm Westergaard.

<sup>1</sup> See p. 45.

*Friday, April 23, 9.30 A.M.*

EXECUTIVE SESSION

Edwin G. Conklin, President, in the Chair

Secretary Swann read the names of those members<sup>1</sup> who had died since the last meeting while the members present stood as a mark of respect.

President Conklin presented his annual report and gave a detailed account of the activities of the Society during previous wars and asked what the duties of a learned society such as the Philosophical Society may be in time of war such as that which the world is passing through at the present time. He stated that a complete report on the activities of the Society for the year 1942 would be found in the YEAR BOOK which will be reviewed to the present date by the Chairmen of the Standing Committees.

Dr. Eisenhart, Chairman of the Committee on Research, stated that for the past two years scientists in certain fields have been engaged in research related to the war and demands for men in these fields have increased following the entry of the United States into war to such extent that now the demand exceeds the supply. This situation has been reflected in the requests to the Committee on Research for grants in these fields. Consequently, at the close of the past year there were substantial balances in the Penrose, Johnson, and Daland Funds. The Committee anticipated the situation and on recommendation, approved by the Council at its November meeting, requested that in the case of each fund there should not be any reduction in the amount assigned from these funds for the year 1943, and that the balances just referred to be carried over, not only from 1943, but subsequently also, against the time when the Committee is likely to be faced with demands above normal as the scholars of the country, and particularly the younger ones, are once again able to proceed with their investigations in fundamental research. He further reported on the amounts available for the respective funds and stated that copies of the report reprinted from the YEAR BOOK were available.

Dr. Schramm, Chairman of the Committee on Publications, called attention of the members to the assumption last June of the office of Editor by Dr. William E. Lingelbach to organize the publication work. The present year promises to be one of the largest in

<sup>1</sup> See p. 362.



terms of publication of material in recent years. Dr. Schramm stated that a year and a half ago the format of the PROCEEDINGS had been changed and that the small bulk of the PROCEEDINGS may lead to the erroneous conclusion that it means less publications. There will be the same amount of material, measured not in pages, but in words, but occupying only two-fifths of the space on the shelf that it formerly occupied.

Dr. Schramm stated that one of the main causes of delay in the issuance of certain publications has been the policy to announce not only the volume but the issue in which is to appear the papers centering around some subject, especially Symposia of which there have been many in recent years. A policy has been recently adopted with rare exceptions that manuscripts committed to type remain in galley proof until the issue is ready to be made up, and no delay on any one's part can hold up the appearance of other papers.

President Conklin stated that the Society should know of the really serious efforts which Dr. Schramm has made in bringing about savings in publications, not only in the change of format of the PROCEEDINGS and TRANSACTIONS but in other ways. There came to the Society a request from the American Council of Learned Societies for the publication of a *Linguistic Atlas* of the southeastern states, at a very large expense, and Dr. Schramm took up this subject with the manufacturers of type and worked out a scheme by which the cost of the publications in acceptable form can be very greatly reduced, indeed it was estimated that the *Atlas* should be produced for 25% of its present cost. This has rendered a real service to American scholarship in that field because the hope is that this *Atlas* may ultimately be extended all over the United States. This proposed change has been brought to the attention of the American Council of Learned Societies.<sup>1</sup>

President Conklin further stated that the Editorial Board had not been found to be practical and it was decided that in the future the Committee on Publications shall be the Editorial Board.

Dr. Lingelbach, Editor, gave a complete list of the publications which are about to be issued and stated that a report on the activities of the Committee for the year would be found in the YEAR BOOK.

Dr. Lingelbach, Chairman of the Committee on Library, presented a report on the activities of the Library and called attention

<sup>1</sup> See p. 115.

to the fact that the Library located in the Drexel Building is inadequately housed. The Committee is taking steps to carry out the recommendations of the report of the Special Committee on Library, published in the YEAR BOOK for 1942, pp. 240-244. Also it is continuing the policy of strengthening the holdings of Franklin Papers. Dr. Lingelbach called attention to the many new acquisitions and stated that a complete report would be found in the YEAR BOOK.

President Conklin stated that as a precaution against possible bombing certain of the Society's most valuable portraits, busts, and manuscripts had been removed to places of greater safety for the duration. He also stated that buckets of sand and stirrup pumps had been provided for both the Library and the Hall of the Society.

Mr. Morgan, Chairman of the Committee on Finance, presented his report and gave a brief account of the activities of the Committee. Mr. Morgan called attention to the execution of the new Deed of Trust between the Girard Trust Company and the American Philosophical Society which will allow the Society to use the income from the Building Fund hereafter for the general purposes of the Society including rent for a library, or maintenance of the Hall, but stated that the application of that income rests with the Council. Copies of the report reprinted from the YEAR BOOK were available.

On motion, the report of the Treasurer was approved and the Society expressed its thanks to the Committee on Finance for the care it has taken of the Society's funds.

Authorization was given to the Officers of the Society to execute the new Deed of Trust between the Girard Trust Company and the American Philosophical Society which will allow the Society to use the income from the Building Fund hereafter for general purposes. The Resolution as approved at the Executive Session<sup>1</sup> of the Society on November 21, 1942, and which was referred to the Committee on Finance with power to modify or leave the same unchanged was by the Committee on Finance left without any change.

The following Committee on Finance was nominated by the President and elected for the year 1943-44:

Marshall S. Morgan, *Chairman*

Thomas S. Gates

Edward Hopkinson, Jr.

J. Henry Scattergood

John Story Jenks

Roland S. Morris

Charles J. Rhoads

<sup>1</sup> See YEAR BOOK for 1942, pp. 44-45.

President Conklin informed the Society that it had been suggested that additional persons other than Philadelphians should serve on this Committee and that the Council requests the Society to authorize the Committee on Finance to add the names of two more persons to the Committee if it is found practical to appoint such persons. After some discussion the following recommendation was approved:

*Resolved*, that the President be authorized to appoint two additional members on the Committee on Finance at his discretion.<sup>1</sup>

President Conklin announced the names of those persons elected by the Council or appointed to serve on the Standing Committees of the Society for the coming year.

#### *The John F. Lewis Prize*

President Conklin stated that the Council had approved the award of the John F. Lewis Prize to George Gaylord Simpson of the American Museum of Natural History for the following work, reported to and published by the Society:

“The Beginnings of Vertebrate Paleontology in North America.” (Read February 14, 1942. Proc. Amer. Philos. Soc. 86: 130-188.)

The new amendment to the Laws proposed at the Autumn Meeting in November was on motion approved as follows:

Chapter III, Article 10. “No elective office in the Society except that of Treasurer shall carry any salary, but Officers may be reimbursed for any necessary expenditures made in the performance of their duties.”

President Conklin stated that he had called the Council’s attention to the necessity of making certain necessary repairs in the building as soon as possible after the war. On motion, the following resolution recommended by the Council was approved:

*Resolved*, that the Committee on Hall with President Conklin be authorized to go ahead and make contact now with an architect to be chosen by the Committee to draw up plans for the proposed alterations and that such plans be paid from the Building Fund.

<sup>1</sup> See p. 30.

A letter was received from The Royal Society regarding the project, which was originally financed by a grant out of the gift which the American Philosophical Society made to British science, and which has proved so fruitful that it has now been taken over by the Department of Scientific and Industrial Research.

The following Library accessions were gratefully received, and acknowledged :

Four hundred and seventy-five letters written to Samuel George Morton, 1819-50, were presented in April 1943 by Arthur V. Morton and Mrs. John Story Jenks, grandchildren of Mr. Morton.

Two hundred and twenty-one Rafinesque papers, 1808-40, were deposited in March 1943 by the Academy of Natural Sciences of Philadelphia. Included in this collection are letters to and from C. S. Rafinesque, writings by Rafinesque and miscellaneous items.

Three hundred printed items by and about Thomas Jefferson were recently purchased for the sum of \$400 from the estate of the late William H. Jenks.

#### *Annual Election*

The Society proceeded to the election of officers and members. Harlow Shapley and Samuel A. Mitchell acted as Judges and Marston T. Bogert and Frederick L. Hisaw as Clerks of Election.

The tellers subsequently reported that the following officers and members had been duly elected :

#### OFFICERS

##### *President*

Edwin G. Conklin

##### *Vice-Presidents*

Frederick P. Keppel

Edward P. Cheyney

Thomas H. Morgan

##### *Secretaries*

W. F. G. Swann

Ernest M. Patterson

*Curator*

John Story Jenks

*Treasurer*

Fidelity-Philadelphia Trust Company

*Councillors*

(To serve for three years)

Arthur B. Coble, *Class I*Herbert S. Gasser, *Class II*Edmund E. Day, *Class III*Frank Aydelotte, *Class IV*

## MEMBERS

## CLASS I—MATHEMATICAL AND PHYSICAL SCIENCES

*Resident*

Raymond Thayer Birge, Berkeley, Calif.

Samuel Colville Lind, Minneapolis, Minn.

Donald Howard Menzel, Cambridge, Mass.

Marshall Harvey Stone, Cambridge, Mass.

Merle Antony Tuve, Chevy Chase, Md.

Frank Clifford Whitmore, State College, Pa.

*Foreign*

Sir William Lawrence Bragg, Cambridge, England

Luitzen Egbertus Jan Brouwer, Amsterdam, Netherlands

Godofredo García, Lima, Peru

## CLASS II—GEOLOGICAL AND BIOLOGICAL SCIENCES

*Resident*

Rollin Thomas Chamberlin, Chicago, Ill.

Ralph Works Chaney, Berkeley, Calif.

Hans Thacher Clarke, New York, N. Y.

Leslie Clarence Dunn, Riverdale, N. Y.

Ernest William Goodpasture, Nashville, Tenn.

Warren Harmon Lewis, Philadelphia, Pa.

George Linius Streeter, Baltimore, Md.

## CLASS III—SOCIAL SCIENCES

*Resident*

Julian Parks Boyd, Princeton, N. J.  
Douglas Southall Freeman, Richmond, Va.  
Owen Lattimore, Baltimore, Md.  
Henry Allen Moe, Riverdale-on-Hudson, N. Y.  
Walter W. Stewart, Gladstone, N. J.  
Quincy Wright, Chicago, Ill.

## CLASS IV—HUMANITIES

*Resident*

William Ernest Hocking, Cambridge, Mass.  
Fiske Kimball, Philadelphia, Pa.  
Charles Grosvenor Osgood, Princeton, N. J.  
Erwin Panofsky, Princeton, N. J.  
Mary Hamilton Swindler, Bryn Mawr, Pa.  
George Clapp Vaillant, Philadelphia, Pa.

*Foreign*

John Davidson Beazley, Oxford, England  
Alan Henderson Gardiner, London, England

## COUNCIL NOMINEES

Chester Irving Barnard, Newark, N. J.  
Henry Agard Wallace, Washington, D. C.

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3. AUTUMN GENERAL MEETING, NOVEMBER 19, 20, 1943

One hundred and sixteen members and approximately one hundred guests attended this meeting and twenty papers were read.<sup>1</sup> Two sessions of the meeting were devoted to a Symposium on the Organization, Direction, and Support of Research.

The Franklin Medal Lecture was given by James B. Conant, President of Harvard University; after the lecture President Conklin presented to him a Franklin Medal and gave a short description of the Medal which was struck by the United States Mint in 1906.

<sup>1</sup> See p. 49.

in commemoration of the two hundredth anniversary of the birth of Benjamin Franklin.

The following recently and newly elected members subscribed the Laws and were admitted into the Society: Chester Irving Barnard, Julian Parks Boyd, Rollin T. Chamberlin, Leslie C. Dunn, William E. Hocking, George A. Hulett, Warren Harmon Lewis, Duncan Arthur MacInnes, Donald Howard Menzel, Wesley Clair Mitchell, Henry Allen Moe, Forest R. Moulton, Charles G. Osgood, Erwin Panofsky, Marshall Harvey Stone, George Linius Streeter, Mary Hamilton Swindler, Merle Antony Tuve, Carl Van Doren, Frank Clifford Whitmore, Robert R. Williams, and Quincy Wright.

Godofredo García of Lima, Peru, signed the Laws on October 29, and was admitted into the Society.

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*Saturday, November 20, 9.30 A.M.*

#### EXECUTIVE SESSION

Edwin G. Conklin, President, in the Chair

The Secretary read the names of those members<sup>1</sup> who had died since the last meeting while the members present stood as a mark of respect.

President Conklin reported that a second series of broadcasts on the Internationalism of Science by the World Wide Broadcasting Corporation which were started in May had to be cancelled in September because the Office of War Information had taken over all short-wave broadcasting. From May 6 to July 1 eight broadcasts were given.<sup>2</sup>

Copies of the report of the Committee on Finance were distributed and Mr. Morgan gave an account of the work of the Committee and the Treasurer. Mr. Morgan stated that \$20,000 had been transferred with the approval of the Committee on Finance from the appropriation to the Committee on Research to the Committee on Library for the opportune purchase of important manuscripts and that in addition to that sum \$5,000 had also been transferred to the Committee on Library for this purpose from the Miscellaneous Fund. The transfer of these funds was discussed at some length and the following resolution which had been approved by the Council was on motion adopted by the Society:

<sup>1</sup> See p. 362.

<sup>2</sup> See p. 53.

*Resolved*, that the Society approves the transfer of the \$20,000 from the Research Fund to the Committee on Library for the purchase of manuscripts with the understanding that this approval should not constitute a precedent for the future.

The Society approved the recommendation that at the close of this year 30% of the Income of each of the following Funds be added to the Principal:

Boyé	Johnson	Phillips Essay
Brush	Lewis	Proud
Carlier	Magellanic	Seybert
Daland	Michaux	Tilghman
Franklin	Norris	Whitfield
Jefferson	Phillips	

The following recommendation by the Council was approved:

*Resolved*, that the balances of unexpended appropriations of the Standing Committees shall be set aside in a new account to be known as a "Reserve Fund for Post-War Expenditures," and that the money previously appropriated to a specific committee shall be available to that committee when needed unless the Council takes other action.

The report of the Committee on Finance and the budget for 1944, as recommended by the Council, were on motion, duly seconded, approved.

Dr. Eisenhart, Chairman of the Committee on Research, reported that since the last meeting of the Council twenty-five grants had been awarded from the Penrose Fund totalling \$18,700 and two grants from the Johnson Fund totalling \$1,000. There is available for future grants this year \$54,955.73 since the transfer of the \$20,000 from the Research Fund to the Committee on Library has now been approved.

Dr. Schramm, on behalf of the Committee on Publications, presented his report, and stated that he is making an analysis of the Committee's expenditures during the past ten years. Dr. Lingelbach, Editor, reported on the publications now in press and on hand for issuance in the PROCEEDINGS and TRANSACTIONS.

The dates for the Annual General Meeting, April 20, 21, and 22, 1944, were formally approved.

Mr. Roland S. Morris called the attention of the meeting to the fact that on the following Wednesday, November 24, Dr. Conklin



will celebrate the eightieth anniversary of his birthday. He then read the following testimonial and moved that it be approved and be spread upon the Minutes of this meeting:

The American Philosophical Society held at Philadelphia for Promoting Useful Knowledge wishes to extend its Felicitations to its President, EDWIN GRANT CONKLIN, honored and active member of the Society for forty-six years, on the celebration of the eightieth anniversary of his birth, and to express its appreciation of his untiring efforts and outstanding accomplishments for the benefit of mankind.

The motion was unanimously carried by a rising vote.

This testimonial engrossed on sheepskin parchment and signed by Mr. Morris, Past President, Dr. Eisenhart, Executive Officer, Dr. Swann, Secretary, and Miss Noonan, Assistant Secretary, was presented to President Conklin.

President Conklin stated that he was greatly surprised and deeply touched by this testimonial of the appreciation and affection of the members. He stated that he loved the American Philosophical Society more than any other organization with which he has been connected. He became a member of it at the age of thirty-four years. Through all the years since, his associations with the members have been both helpful and delightful. "I am grateful more than I can express for this assurance of your friendly sentiments."

## V

### REPORTS OF STANDING COMMITTEES

#### 1. REPORT OF THE COMMITTEE ON MEETINGS

The Committee on Meetings for the year 1943-44 consists of Edwin G. Conklin, *President*, Luther P. Eisenhart, *Chairman*, C. F. Tucker Brooke, George W. Corner, Karl K. Darrow, William B. Dinsmoor, William E. Lingelbach, Ernest M. Patterson, Wendell M. Stanley, and Joseph H. Willits. During 1943 the Committee held four meetings, namely on February 18, May 19, October 21, and December 16.

The Midwinter Meeting of 1943 was devoted to a symposium on Post-War Problems. A sub-committee under the chairmanship of Ernest M. Patterson organized an interesting and varied program. The papers are published in the PROCEEDINGS, Vol. 87, No. 2.

The Annual General Meeting of 1943 in Celebration of the Two Hundredth Anniversary of the Birth of Thomas Jefferson was a memorable occasion. The papers read, which dealt with the widespread interests of Jefferson, are published in the PROCEEDINGS, Vol. 87, No. 3. The same issue contains the address by Carl Van Doran delivered at the Annual Dinner in Celebration of the Two Hundredth Anniversary of the Proposal of Benjamin Franklin to Found the American Philosophical Society. The printed programs of the meeting and of the dinner were designed to serve as appropriate souvenirs of this notable meeting.

At the Autumn Meeting there was a symposium on the Organization, Direction, and Support of Research in the various fields represented in the Society. Also there were a number of papers presented on invitation by recipients of grants. It was a very successful meeting, the largest ever held in the autumn. The papers of the symposium are published in the PROCEEDINGS, Vol. 87, No. 4.

## REGULAR MEETINGS OF THE SOCIETY

*Thursday, February 18, 8.30 P.M.*

JOINT SESSION WITH THE  
GEOGRAPHICAL SOCIETY OF PHILADELPHIA

"The Overland Highway to Alaska." Major Roswell P. Rosengren, Corps of Engineers, U. S. Army, Chief of Office of Technical Information, War Department, Washington, D. C. Illustrated lecture in the Crystal Room of the Benjamin Franklin Hotel.

## MIDWINTER MEETING, FEBRUARY 19, 20, 1943

*Friday, February 19, 10.30 A.M.*

## SYMPOSIUM ON POST-WAR PROBLEMS

EDWIN G. CONKLIN, President, in the Chair

- "The Relation of Science to Society in the Post-War World." James Bryant Conant, President, Harvard University.
- "Post-War International Monetary Organization and Policy." John H. Williams, Dean, Graduate School of Public Administration, Harvard University, and Vice-president, Federal Reserve Bank in New York.
- "Social and Economic Implications of Freedom from Want of Food." Frank G. Boudreau, Executive Director, Milbank Memorial Fund.

An open discussion was led by Warren Randolph Burgess, Banker and Statistician, Vice Chairman, National City Bank of New York, and the following members took part: Victor G. Heiser, Howard M. Jones, Arthur H. Quinn, and others.

*Friday, February 19, 2 P.M.*

FRANK AYDELOTTE, Vice-president, in the Chair

- "Economics of Transition." Alexander Loveday, Chairman, Economic and Financial Section of the Secretariat of the League of Nations.
- "The Implications of Population Change for Post-War Europe." Frank W. Notestein, Office of Population Research, Princeton University.
- "Money and Sovereignty." Robert B. Warren, Professor of Economics, Institute for Advanced Study.

An open discussion was led by Frank A. Fetter, Professor Emeritus of Political Economy, Princeton University, and the fol-

lowing members took part: William F. Albright, Charles G. Abbot, Francis D. Murnaghan, T. Wayland Vaughan, and Nicholas Kelley; Frank W. Notestein and Alexander Loveday, guests.

*Friday, February 19, 8.30 P.M.*

EDWIN G. CONKLIN, President, in the Chair

EVENING LECTURE

"Some Thoughts on Post-War Planning." Alexander Loudon, Ambassador from the Netherlands.

The Lecture was followed by a reception.

*Saturday, February 20, 10 A.M.*

FREDERICK P. KEPPEL, Vice-president, in the Chair

"The Principle of Self Determinism." Oskar Halecki, Director, Polish Institute of Arts and Sciences in America.

"America Enters the Picture." Guy Stanton Ford, Editor, *American Historical Review*.

"The Small Nations in the Post-War World." Halvdan Koht, Retired Norwegian Minister for Foreign Affairs.

An open discussion was led by Robert Livingston Schuyler, Gouverneur Morris Professor of History, Columbia University, and the following members took part: Francis D. Murnaghan, Guy Stanton Ford; Oskar Halecki, guest, and others.

ANNUAL GENERAL MEETING, APRIL 22, 23, 24, 1943

*Thursday, April 22, 10 A.M.*

CELEBRATION OF THE TWO HUNDREDTH ANNIVERSARY OF  
THE BIRTH OF THOMAS JEFFERSON

EDWIN G. CONKLIN, President, in the Chair

"Introduction to the Jefferson Bicentennial Program." Edwin G. Conklin, President, The American Philosophical Society.

"Jefferson and The American Philosophical Society." Gilbert Chinard, Professor of French Literature, Princeton University.

"Jefferson as a Lawyer." Roland S. Morris, Esq.

"Some Contribution of Thomas Jefferson to the Development of the Library of The American Philosophical Society and The Library of Congress." St. George L. Sioussat, Chief, Division of Manuscripts, The Library of Congress, Washington.

*Thursday, April 22, 2 P.M.*

WILLIAM E. LINGELBACH, Vice-president, in the Chair

- "Jefferson the Farmer." M. L. Wilson, Director of Extension Work, United States Department of Agriculture.  
"Jefferson and the Classics." Louis B. Wright, Henry E. Huntington Library and Art Gallery. (Read by Dr. Aydelotte.)  
"Jefferson as Natural Philosopher." Harlow Shapley, Director, Harvard College Observatory.

*Thursday, April 22, 8.30 P.M.*

EDWIN G. CONKLIN, President, in the Chair

THE R. A. F. PENROSE, JR., MEMORIAL LECTURE

- "What is Still Living in the Political Philosophy of Thomas Jefferson?" Carl L. Becker, Professor Emeritus of History, Cornell University.

The Lecture was followed by a reception.

*Friday, April 23, 2 P.M.*

FRANK AYDELOTTE, Vice-president, in the Chair

- "Mountain Growth Within the Mandated Areas of the Southwestern Pacific." William H. Hobbs, Professor Emeritus of Geology, University of Michigan.  
"Time and Its Physiological Measurement." P. Lecomte du Noüy, Directeur a L'École des Hautes Études, University of Paris.  
"Time Factor in the Color Changes of Animals." G. H. Parker, Professor Emeritus of Zoology, Harvard University.  
"Some Experiments on the Transmission of Plant Viruses by Leafhoppers." L. M. Black, Department of Animal and Plant Pathology, Rockefeller Institute for Medical Research, Princeton.  
"The Nervous Factor in Traumatic Shock." Wilbur W. Swingle, Professor of Biology, Princeton University.

*Friday, April 23, 8.30 P.M.*

EDWIN G. CONKLIN, President, in the Chair

EVENING LECTURE

- "Jefferson and the Arts." Fiske Kimball, Director, Philadelphia Museum of Art.

Following Mr. Kimball's address was the rendition of some musical selections, favorites of Jefferson, by a string quartet under

the leadership of Professor Szanto, Director of the Philadelphia Musical Academy, and with the support of Drs. W. F. G. Swann, Peter van de Kamp and Mr. Stahl.

A reception followed.

*Saturday, April 24, 10 A.M.*

FREDERICK P. KEPPEL, Vice-president, in the Chair

“Entropy.” Karl K. Darrow, Research Physicist, Bell Telephone Laboratories.

“An Analysis of the Arc Spectrum of Iron.” Henry Norris Russell, Professor of Astronomy, Princeton University, Charlotte M. Sitterly, Dorothy W. Weeks, and others. (Read by Mrs. Sitterly.)

“The Philosophical Meaning of the Copernican Revolution.” Philipp Frank, Department of Physics, Harvard University.

“Jefferson’s *Garden Book*, 1766–1824.” Edwin M. Betts, Assistant Professor of Biology, Miller School of Biology, University of Virginia.

“French Refugees of 1793 in Pennsylvania.” Elsie Murray,\* Director, Tioga Point Museum.

“Problems of Conservation and Improvement in Relation to Old Philadelphia.” William E. Lingelbach, Professor of European History, University of Pennsylvania.

*Saturday, April 24, 2 P.M.*

Immediately after the luncheon the members and guests visited the grave of Franklin in Christ Church Burial Ground, Fifth and Arch Streets, where a wreath was placed on his grave by President Conklin who also made appropriate remarks. The group then visited the Old Friends Meeting House, the Betsy Ross House, Elfreth’s Alley, Christ Church, Franklin’s Shop on Market Street, Carpenter’s Hall, the Old Custom House, Congress Hall, Independence Hall, and finally assembled for tea at the Hall of the Society.

*Saturday, April 24, 7.30 P.M.*

The Bicentennial Dinner in Celebration of Benjamin Franklin’s Proposal, May 14, 1743, to Found the American Philosophical Society was held at the Bellevue-Stratford Hotel, President Conklin presiding.

\* Recipient of a grant from the Research Funds.

Drs. Charles H. Best and C. E. Kenneth Mees attended the meeting as delegates of The Royal Society of London. Dr. Best presented the greetings of The Royal Society at the Bicentennial Dinner, together with a locket containing on one side a beautiful miniature painting of Sir Isaac Newton and on the other side, two locks of hair, one auburn and the other gray, presumably from Newton in earlier and later life. In accepting this treasure, President Conklin said that he had recently found in the Cabinet of The American Philosophical Society an envelope labelled "Hair of General George Washington." At some future celebration of The Royal Society he hoped that The American Philosophical Society would send a portrait of Washington with a lock of his hair.

Following the dinner an address was given by Carl Van Doren on "The Beginnings of The American Philosophical Society."

The John F. Lewis Prize of \$300 and diploma was awarded to George Gaylord Simpson, Associate Curator of Vertebrate Paleontology, American Museum of Natural History, for his monograph on "The Beginnings of Vertebrate Paleontology in North America." In the absence of Dr. Simpson on military duty in Africa, the prize was received by Mrs. Simpson in a graceful speech.

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#### AUTUMN GENERAL MEETING, NOVEMBER 19, 20, 1943

*Friday, November 19, 10 A.M.*

EDWIN G. CONKLIN, President, in the Chair

"A Study of the Ionization of the Atmosphere by Cosmic and Local Radiation." Victor F. Hess,\* Professor of Physics, Fordham University.

"The Scablands Glacial Lobe in Eastern Washington." William H. Hobbs,\* Professor Emeritus of Geology, University of Michigan.

"New Hybrids from Incompatible Crosses in *Datura* Through Culture of Excised Embryos on Malt Media." Albert F. Blakeslee,\* Director, Genetics Experiment Station, Smith College, and Sophie Satin.

"Recovery of Midwestern Prairies from Drought." John E. Weaver,\* Professor of Plant Ecology, University of Nebraska. (Read by Elmer D. Merrill.)

"Periodicity in Growth of Long Bones." Charles B. Davenport, Research Associate (ret.), Carnegie Institution of Washington.

\* Recipient of a grant from the Research Funds.

- "Latency-Relaxation and Mechano-Chemical Coupling in Muscular Contraction." Alexander Sandow,\* Assistant Professor of Biology, Washington Square College of Arts and Science.
- "A Ciné-Photomicrographic Study of the Activities of Lymph Vessels and Macrophages in the Disposal of Extravasated Red Blood Cells." Carl C. Speidel,\* Professor of Anatomy, University of Virginia.
- "Study of the Soaring Technique of the California Condor." John H. Storer,\* Waltham, Mass.

*Friday, November 19, 2 P.M.*

SYMPOSIUM ON THE ORGANIZATION, DIRECTION, AND  
SUPPORT OF RESEARCH

GEORGE HOWARD PARKER in the Chair

- "Research in the Physical Sciences." Hugh S. Taylor, David B. Jones Professor of Chemistry, Princeton University.
- "The Discovery and Interpretation of Biological Phenomena." Detlev W. Bronk, Professor of Biophysics, Director, Eldridge Reeves Johnson Foundation for Medical Physics, University of Pennsylvania.
- "Medical Research." Alan Gregg, Director for the Medical Sciences, Rockefeller Foundation.

An open discussion was led by Karl K. Darrow, Research Physicist, Bell Telephone Laboratories, New York.

*Friday, November 19, 8.30 P.M.*

EDWIN G. CONKLIN, President, in the Chair

FRANKLIN MEDAL LECTURE

- "The Advancement of Learning in the United States in the Post-War World." James B. Conant, President, Harvard University.

The Lecture was followed by a reception.

*Saturday, November 20, 10.30 A.M.*

EDWARD P. CHEYNEY, Vice-president, in the Chair

- "Political Economy in the Modern State." Harold A. Innis, Professor of Political Economy, University of Toronto.
- "War and Historiography." Robert Livingston Schuyler, Gouverneur Morris Professor of History, Columbia University.



"Merchants of Light: Research in Arts and Letters." Marjorie Hope Nicolson, Professor of English, Columbia University.

An open discussion was led by Roy F. Nichols, Professor of History, University of Pennsylvania.

*Saturday, November 20, 2 P.M.*

W. F. G. SWANN, Secretary, in the Chair

"Vertebrate Fossils of the Duchesne River Beds." William Berryman Scott,\* Professor Emeritus of Geology, Princeton University.

"The International Character of Economics." Edwin Walter Kemmerer, Professor Emeritus of International Finance, Princeton University.

"Economic Aspects of Controlled Mating of Honeybees." Lloyd R. Watson,\* Professor of Chemistry, Alfred University.

"The Centennial Edition of Sidney Lanier." Charles R. Anderson,\* Associate Professor of American Literature, Johns Hopkins University.

"Theory of Drawing in Italy and France During the Renaissance and Baroque." Charles de Tolnay,\* Institute for Advanced Study. (Read by title.)

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THE AMERICAN PHILOSOPHICAL SOCIETY'S  
BROADCASTS

In the YEAR BOOK for 1942, pp. 56-58, a report was made on the first fifteen broadcasts over the short-wave station WRUL of the World Wide Broadcasting Corporation, with the explanation that the series had to be discontinued after all short-wave stations had been taken over by the Office of War Information.

At the Meeting of the Council of the Society, November 21, 1942, a resolution was passed providing for further payments to the Broadcasting Corporation of certain conditions (see YEAR BOOK for 1942, p. 43). The Committee in charge of the Society's broadcasts employed Dr. Serge A. Korff to act as its Coordinator in arranging for and carrying out any future program. Dr. Korff conducted this work with great patience and skill and the Committee is deeply obliged to him for the time and labor he devoted to this work. Extracts from his report to the American Philosophical Society follow.

\* Recipient of a grant from the Research Funds.

*Purpose of the series.*

The purpose of this series was to present to a world-wide radio audience the point of view of internationalism in science. It is a fact familiar to scientific workers that a complete internationalism exists in scientific work. Such work is in no wise limited by international boundaries. Investigations and researches started by one man in one country may be continued by another man in another country to the mutual benefit of all mankind. The average scientist is not concerned whether a colleague working in his field is a Czechoslovak or Chinese, as long as the work which he does is of merit. The purpose of the series was to draw illustrations from different fields, all of which would prove the main thesis of internationalism. In the several broadcasts, each speaker was asked to discuss the international aspects of his field.

At the meeting of the Broadcast Committee in the early summer of 1943, it was decided to broaden the base of the series, and to invite speakers from fields other than the physical sciences, in which international cooperation had been unusually successful. Examples of these fields are the Rhodes Scholarships, the International Labour Office and the international narcotic control. This decision to broaden the series was taken, due to the difficulty of securing enough speakers in the physical sciences, and also to increase the interest and breadth of appeal to the listening audience.

*Administrative procedure.*

In order to carry out this program, a list of possible speakers was drawn up and approved by the Broadcast Committee. These persons were invited to prepare broadcasts showing how internationalism manifested itself in their several specialties, such as "Internationalism in Astronomy" or "The International Aspect of Ichthyology" or "International Cooperation in Seismography." The talks thus prepared were then edited by the Coordinator in conjunction with the Program Manager of the broadcasting station. This frequently involved discussion with the author as to changes in terminology and content. After a script had been put into a form acceptable to the radio station, it was then forwarded to the Office of War Information for clearance. As soon as official clearance was received, the speaker was invited to record his broadcast and the broadcast was subsequently made from the disk.

*Schedule of broadcast.*

In the present series the following talks were given:

- May 6. The Stars are International. Harlow Shapley, Director, Harvard College Observatory.
- May 13. Botany is International. Elmer D. Merrill, Professor of Botany, Administrator of Botanical Collections, Harvard University.
- May 27. Geology is International. Alfred C. Lane, Professor Emeritus of Geology, Tufts College.
- June 3. International Cooperation in Seismology. L. Don Leet, Seismologist in Charge of Seismograph Station, Harvard University.
- June 10. International Cooperation in Oceanography. T. Wayland Vaughan, Director Emeritus, Scripps Institution of Oceanography; Associate in Paleontology, United States National Museum.
- June 17. Building a Free World—Epidemic Disease. W. Lloyd Aycock, Assistant Professor of Preventive Medicine and Hygiene, Harvard Medical School.
- June 24. Science is International. Karl K. Darrow, Research Physicist, Bell Telephone Laboratories.
- July 1. Tropical Disease is International. Horace W. Stunkard, Professor of Biology and Head of the Department, New York University.

The following have been promised:

- Mathematics is International. Arnold Dresden, Professor of Mathematics, Swarthmore College.
- Birds are International. Robert C. Murphy, Curator of Oceanic Birds, American Museum of Natural History.
- International Cooperation in Plant Introduction. David G. Fairchild, Director (ret.), Foreign Plant and Introduction, U. S. Department of Agriculture.
- International Cooperation in Narcotic Control. Harry J. Anslinger, U. S. Commissioner of Narcotics.
- International Cooperation in Soil Conservation. Hugh H. Bennett, Chief, Soil Conservation Service, U. S. Department of Agriculture.
- The International Labor Office. Edward J. Phelan, Acting Director of the International Labor Organization.

*Problems encountered.*

A number of serious administrative difficulties arose in conducting this broadcast series. It is desirable to summarize these in order that the experience gained may be of guidance to future plans of this type. The problems may be divided into the following several classifications:

*Difficulty in securing speakers.*

One of the most serious problems arose because speakers were busy. Owing to the great strain which the war has placed on virtually all scientific workers, many speakers refused to participate in the series. Sixteen persons who were invited declined to take part in the series. Many of the speakers who promised to have a script ready by a certain date asked that it might be delayed, and delayed again. Several persons invited in May sent scripts in November. Even then the scripts arrived only because of a constant flow of letters from the Coordinator urging the author to produce his script.

In several cases, after a prospective speaker had accepted, he decided to withdraw due to the pressure of work. These withdrawals further added to the difficulties of planning and conducting the series.

*Difficulty in securing time on the air.*

The radio station at this time was also under a great strain. The Office of War Information would allow time on the transmitters to be released only if the broadcast conformed to a certain standard. This Office was not willing to release time on the transmitters for discussions of purely scientific problems, however meritorious such a program might be in peacetime. The radio station was taken over for the exclusive use of the Government immediately upon the invasion of Sicily and was not returned to the broadcasting station for other activities, including the present series, for some time thereafter. The program therefore suffered an unavoidable hiatus.

*Difficulties in choice of subject.*

One of the serious difficulties in carrying out this program was in explaining to the speakers just exactly what would and would not be permitted over the radio. The Coordinator was limited

within very narrow bounds by the Office of War Information and the broadcasting station in what he could invite the speakers to discuss. Most of the speakers did not like this type of limitation. Most of the speakers wished to discuss their own subjects and, in particular, the technical aspects of these, rather than the broader question of international cooperation as exemplified by their subjects. It was therefore necessary to conduct extensive correspondence and interviews with the speakers in order to explain to them what was wanted. A letter was prepared in conjunction with the broadcasting station which was carefully worded, so that there could be no possible misconstruction placed upon it. Unfortunately, several of our speakers showed from their subsequent scripts that they had not understood or had not carefully read the letter. In the letter it was pointed out that the Office of War Information would not permit a discussion of the technical aspects of a subject, but would only permit the international features of the subject to be presented. Many of our speakers prepared talks in which too much emphasis was placed upon the technical details and not enough upon international aspects. Since we had discovered by previous experience that such scripts would immediately be returned by the Office of War Information with a refusal, it was necessary to send these scripts back to the authors together with the request that more emphasis on the international implications and less on the technical details be included. It is pleasing to note that most of our authors responded to this request and sent us scripts which eventually became passable for radio use. However, two of our speakers withdrew their scripts from the series.

A further difficulty with the choice of subject arose when several speakers inquired whether many persons would be interested in listening, in the midst of a war, to a broadcast series discussing a peacetime problem. The majority of listeners to short-wave broadcasts in wartime are known to be interested chiefly in spot-news. Upon inquiry, the Coordinator was unable to secure any estimates as to the number of listeners to this series. The question therefore remains unanswered.

*The problems of rewriting.*

One of the major difficulties encountered in this broadcast series was in making the scripts conform to the requirements of radio. With the exceptions of two of the scripts, every talk had to be re-

written to a greater or less extent. This was due to two factors: the first, that the average author did not adhere to the topic assigned to him, namely, internationalism; the second was that even those speaking as closely as possible on the subject as defined showed a tendency to use too many technical terms and to write a script which, while it would be scholarly in quality and interesting to others in his field, would also be completely outside the comprehension of the average radio listener. The operation of rewriting the scripts was under the joint supervision of the Coordinator and the Program Manager of the broadcasting station. The problem of rewriting a scientific script for non-scientific consumption, without destroying the exact meaning, is an extremely difficult one and is quite laborious, consuming both time and effort to an extent which makes it a heavy burden to place on someone who has other duties.

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#### MEETINGS OF OTHER ORGANIZATIONS .

##### THE ARCHAEOLOGICAL INSTITUTE OF AMERICA, PHILADELPHIA SOCIETY

*January 27, 8:15 P.M.* Kenneth J. Conant, Professor of Architecture, Harvard University, "Russian Church Architecture."

*March 11, 8:15 P.M.* Harald Ingholt, Lecturer on Classical Civilization, Yale University; Director of the Danish Excavations at Hama, Syria, "Palmyra, a Caravan City in the Syrian Desert."

*April 28, 8:15 P.M.* Samuel N. Kramer, Research Fellow, University Museum, University of Pennsylvania, "The Sumerian 'Book' Catalogue of About 2000 B.C."

Valentin Muller, Associate Professor of Classical Archaeology, Bryn Mawr College, "The Shrine of Janus Germinus in Rome."

Howard Comfort, Associate Professor of Classical Philology, Haverford College, "Roman Pottery in Bombed Museums."

##### THE JAYNE MEMORIAL LECTURE

*March 31, 8:30 P.M.* The Jayne Memorial Lecture for 1943 was presented by Detlev W. Bronk, Professor of Biophysics and Director of the Johnson Research Foundation, University of Pennsylvania, and Coordinator of Research, Air Surgeon's Office, U. S. Army Air Forces, on the subject of "Physical Machines and Physiological Mechanisms in Aviation."

## AWARDS OF THE JOHN SCOTT MEDAL AND PREMIUM

Presented by the Board of Directors of City Trusts of Philadelphia.

*November 18, 8:30 P.M.* Dr. Otto Stader, Veterinary Surgeon, for the invention of the reduction and fixation bone splint.

John C. Garand, Chief Engineer Ordnance, Springfield Armory, for the invention of the U. S. Rifle Cal. .30 M.I.

Dr. Richard E. Shope, Commander, U. S. N. R., Member, Rockefeller Institute for Medical Research, Princeton, for the discovery of the complex etiology of swine influenza.

*December 16, 8:30 P.M.* Vannevar Bush, President of the Carnegie Institution of Washington and Head of the Office of Scientific Research and Development, and Samuel H. Caldwell, Massachusetts Institute of Technology, for the development of the differential analyzer.

Dr. Walter E. Dandy, Professor of Neurological Surgery, Johns Hopkins University, for the development of ventriculography.

Dr. Chevalier Jackson, Honorary Professor of Broncho-Esophagology, Temple University, for devising instruments and methods useful in bronchoscopy.

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The Corporation and Executive Board of The Union Library Catalogue—January 14.

Conference on International Law—February 13-14.

American Law Institute—March 4, 5, 6.

Special Libraries Council of Philadelphia and Vicinity—May 7.

American Council of Learned Societies, Advisory Board and Executive Committee—June 16-17.

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On November 23, the first anniversary of the SPARS, Women's Reserve of the U. S. Coast Guard, a wreath was placed by various representatives of the SPARS and the U. S. Coast Guard on the Society's bust of Alexander Hamilton, Founder of the Coast Guard.

## 2. REPORT OF THE COMMITTEE ON HALL

The Committee on Hall for the year 1943-44 consists of the following members: John Story Jenks, *Curator-Chairman*, Paul P. Cret, Leicester B. Holland, Fiske Kimball, Marshall S. Morgan, Lawrence J. Morris, Francis R. Packard, John M. Scott, and *ex-officio*, Edwin G. Conklin, *President*; and Luther P. Eisenhart, *Executive Officer*.

During the year one meeting of the Committee on Hall was held on June 18, as well as a number of informal meetings of the Chairman and the President. At this meeting the following Resolution which was approved by the Council at its meeting on April 21, 1943 was presented:

*Resolved*, that the Committee on Hall with President Conklin be authorized to go ahead and make contact with an architect to be chosen by the Committee to draw up plans for the proposed alterations and that such plans be paid for from the Building Fund.

The Committee considered at length the nature of the alterations which would be desirable to restore and improve the Society's building, both in exterior form and interior requirements, and President Conklin was requested to put into writing his suggestions and ideas regarding the necessary requirements in the alterations to be made in the building. This he did in a series of eight proposals, which are attached to the Minutes of this meeting of the Committee. The Committee was of the opinion that a preliminary study of these proposed alterations should be prepared by an architect, without making definite commitments as to future action, and submitted to the Committee for approval before entering into any contract for the preparation of detailed plans.

However, several conditions have caused the Officers to postpone further action at this time. Among these is the fact that detailed plans and specifications for the restoration and functional requirements of the entire building had been prepared by Paul P. Cret, Architect, in 1934, but only a portion of these plans, involving the rooms on the first floor and a portion of the basement were executed at that time. Again in 1938, Mr. Cret prepared a sheet



of modified floor plans embodying certain suggestions offered by members of the Committee, but leaving certain needs unsatisfied. In particular, means must be found if possible to save floor space in the third story and to allow for a suitable stairway to the third floor. No attempt was made at that time to execute Mr. Cret's plans, and of course no alterations are now possible until after the war. Consequently, after correspondence between Mr. Cret, the President and the Chairman the retention of Mr. Cret as Architect was terminated cordially. The Society highly appreciates the professional skill and friendly services of Mr. Cret, which have made our present lecture room admired by all, and the Committee on Hall expresses to him its sincere thanks for his long-continued services on the Committee.

The portrait and bust of Jefferson, and the portraits of Franklin and Washington were brought back from the country, where they and other portraits and busts had been placed for safety, to the Hall of the Society for the Jefferson Bicentennary Meeting, but by action of the Council they were ordered returned to their place of safety in the country after the meeting. However, this property was later sold and the Society's artistic objects together with those of other institutions had to be removed. Consequently, the busts and portraits have been returned to the Hall of the Society where they are now in their accustomed places.

### 3. REPORT OF THE COMMITTEE ON LIBRARY

The Committee on Library presents the following report for the calendar year 1943.

#### *Library Committee: Personnel, Meetings, and Policy.*

The Committee consists of William E. Lingelbach, *Chairman*, Julian P. Boyd, Gilbert Chinard, George W. Corner, Karl K. Darrow, J. Percy Moore, Horace C. Richards, A. S. W. Rosenbach, St. George L. Sioussat, Carl Van Doren, and ex-officio, Edwin G. Conklin, *President*, and Luther P. Eisenhart, *Executive Officer*.

Four regular meetings and one special meeting were held during the year, namely on February 20, April 10, May 19, October 21, and December 16.

The Library of the American Philosophical Society, which also includes its archives, has been the subject of considerable study and discussion during the past year. In April 1941, a Special Committee of the Library<sup>1</sup> submitted a Report to the Society recommending certain factors that should be considered as basic in the consideration of the future development of both the Library and the archives. Foremost among these was the fact that our Library is in no sense a popular one, but a scholars' library with a large and valuable archival collection. It has always been more or less highly specialized, though not in accordance with any consistent policy or plan. To clarify the situation, the Report suggested the need of specialization in certain fields. In adopting the Report, the Society at its Annual Meeting in April 1941 laid especial emphasis on the points in a resolution:

That the Library Committee be urged, in selecting fields and subjects for cultivation, to insist even more rigidly than in the past upon choosing those capable of development to a point of superiority. . . .<sup>2</sup>

In its efforts to carry out this policy the Library Committee has found it very difficult to choose the fields or subject capable of development to a point of superiority. In order to arrive at a

<sup>1</sup> Report of the Special Committee on the future policy of the Library. Amer. Philos. Soc. Yr. Bk. 1941: 275-281.

<sup>2</sup> Amer. Philos. Soc. Yr. Bk. 1941: 38.

selection in so important a matter, a variety of conditions, some of them purely local in character, have to be considered. Foremost among these are certain traditions and concerns of the Society throughout the two centuries of its history, traditions closely associated not alone with a deep interest in research but also with the synthesis of its results and hence "the promotion of useful knowledge"; and finally the fact that the Library holdings are fairly strong in a few fields and weak and inadequate in others.

The Library's principal collections of manuscripts and books lie in the field of colonial and Revolutionary history. They comprise, among others, the richest collection of Frankliniana in existence, and it is the unanimous opinion of the Committee on Library that every opportunity to strengthen our holdings in this direction should be given priority consideration.

As to the other fields, tentative plans have been made to build up both the Library and the archives in the early history of science and learning in America. In this connection the acquisition in recent years of a number of collections of manuscripts and books of American scientists and scholars, many of them former members of the Society, has suggested the advisability of an active program to secure significant papers and works of men eminent in the fields of science and learning, with the definite objective of building up an outstanding archive on the history of science and thought in this country. A great deal of significant material, now being neglected, is doubtless available without cost. Certainly a real service to American scholarship would be rendered by letting it be known that the Society is collecting materials of this kind and making them available for scholarly use in the future.

In recognition of Franklin's great achievement in the field of diplomacy, it has been urged by some that the Society develop a section in some restricted field of international relations, possibly biographical matter on the representatives of the nation at home and abroad who contributed most to the formulation and conduct of our foreign policy during the Revolutionary and early national period. Both the tradition and the character of the American Philosophical Society make it a natural custodian of archive material in this field also.

In the meantime the policy of securing transcripts and microfilms of materials relating to the special fields of the Library's interests is being steadily expanded. An outstanding example in

this year of the Celebration of the Two Hundredth Anniversary of the Birth of Thomas Jefferson is the arrangement for the acquisition of microfilms of Jefferson manuscripts in the Library of Congress, the Historical Society of Pennsylvania, and the Massachusetts Historical Society.

Finally, as the formulation and implementing of a constructive policy of the administration of the Library advances, it is becoming more and more evident that a library and archives building should be made an integral part of that policy, even though its realization will of necessity have to wait for the return of peace.

Although the principles of the policy of greater specialization have not been clearly defined as yet, serious consideration has been given to books in certain classes which obviously lie outside of the interests of the Society, and a beginning has been made with respect to disposing of material irrelevant to the program. An excellent detailed survey of the medical holdings was made by Dr. Corner whose recommendations with respect to the disposition of this material are now being acted upon. The existence of the large and growing medical library at the College of Physicians of Philadelphia obviates entirely the need for further development along these lines by the Society. Only titles of significant importance in the history of American medicine or having some special association value to the Society are being retained. The balance of the material is being disposed of by exchange, gift, or sale, and every effort is being made to place the items where they will be of most service. To this end, the College of Physicians and the Surgeon-General's Office are given priority of choice. Since about forty per cent of the material had never been catalogued, the survey brought to light several interesting items, including a collection of some 250 dissertations submitted to colleges and universities in this country and abroad during the years 1752 to 1827, and a copy of C. S. Rafinesque's *The Pulmist*.<sup>1</sup> Needless to say these are among the items being retained. The Committee extends to Dr. Corner its appreciation and thanks for the time and thought he has spent and continues to spend on this project.

Among the little-used material which was transferred in 1942 to an extra room in the Drexel Building, to lessen the fire hazard in the third floor of the Society's Hall, was the collection of state,

<sup>1</sup> Philadelphia, 1829. T. J. Fitzpatrick mentions only six known copies in his bibliography of Rafinesque published in 1911.

territorial, and foreign agricultural documents. Since practically all of these files are duplicated at the Free Library which is the center for document research in the Philadelphia area, it was decided to dispose of the entire collection, consisting of approximately 1,000 bound volumes and 9,000 unbound issues. Lacunae in the Free Library files were supplied first to insure as complete listings as possible in the city. The balance of the material was distributed to the following institutions: U. S. Department of Agriculture, Pennsylvania State College, Rutgers University, Iowa State College, and the state experiment stations of Connecticut, Georgia, Kentucky, and Oregon. A beginning having thus been made on the survey of the agricultural holdings, federal documents and specialized journals will be considered next.

Studies of the mathematical holdings under the supervision of Dr. Eisenhart, and of the physical holdings by Drs. Richards and Darrow, are in process. An appeal for material to help build a library for the newly organized Institute of Mathematics at the National University of Mexico was answered by contributing 22 titles, consisting, with one exception, of duplicates and short files of discontinued journals found elsewhere in the city. The exception and most important item was the complete file of the *Transactions* of the American Mathematical Society, V. 1-53, no. 2, 1900-1943. Arrangements were made to have subsequent issues of the *Transactions* sent to the Institute on the Society's exchange account. The following files were sold to the Institute for Advanced Study at Princeton:

Hiroshima University. Journal of Science—Ser. A. Mathematics, physics, chemistry. V. 1-11, no. 1, 1930-1941.

Japanese Journal of Mathematics. V. 1-17, no. 2, 4, 1924-1941.

Tokyo. Imperial University. Faculty of Science. Journal—Sect. 1. Mathematics, astronomy, physics, chemistry. V. 1-3, no. 6, 1925-1937.

A total of 24 items were sent to the American Physical Society, Rosemont College, and Temple University from a preliminary list of physics discards.

#### *Accessions.*

Although the war and an undefined policy continue to limit drastically the purchase of contemporary works, this has been a

notable year with respect to the acquisition of archival or source material by gift and deposit as well as purchase.<sup>1</sup> A special appropriation of \$25,000 was granted by the Council in order that several extraordinary collections of manuscripts, chiefly Franklinitiana, might be considered. The Committee recognizes the fact that if the prestige of the Society with respect to its great collection of Franklinitiana is to be maintained there is a definite obligation to procure such items as have a direct relationship to the present collection as they appear on the market from time to time. It has adopted the policy, however, of stressing the importance of material which will provide data for new scholarly research over mere autographs and museum pieces of interest chiefly to the bibliophile. Since only about half of this sum was expended in 1943, a new fund was created with the remainder to which the yearly balance of the B and B Fund is to be added. It is to be known as the Manuscripts and Imprints Fund and is to be used specifically for the purchase of archives and primary source material. The policy regarding its use will be:

1. To allow it to accumulate, drawing upon it only when current library funds are depleted or insufficient.
2. To be spent only by consent of the Council, by mail vote if necessary, when the proposed expenditure reaches a certain figure (to be determined later).

Owing to world conditions the number of serial titles received continues at a much lower figure than during normal times—385 by exchange, 145 by purchase, and 148 by gift. New titles include *Bibliographies on German American History*, published by the Carl Schurz Memorial Foundation, *Obituary Notices* of the Royal Society of London, *Bulletin* of the Polish Institute of Arts and Sciences in America, *Scientific Monthly*, and the *Quarterly Journal of Current Acquisitions* published by the Library of Congress. The following were discontinued—*Physical Review*, *Reviews of Modern Physics*, *Journal of Chemical Physics*, *Agricultural Index*, and *Book Review Digest*.

The total accessions for the year include 706 volumes, of which 493 were serials, 453 pamphlets, 787 manuscripts, 19 maps, 15 photostats and photographs, 3 broadsides, 5 news clippings, 1

<sup>1</sup> It has been customary in the past to note in some detail the more important accessions. Beginning with this year, the list is placed in the addenda to the Report which contains also short articles on significant items of the Society's holdings. See p. 107.

medal, 1 engraving, 1 lithograph, 1 microfilm, 1 miniature, and 1 reading machine. Of these there have been acquired by deposit, exchange, or gift 487 volumes, of which 386 were serials, 284 pamphlets, 711 manuscripts, 19 maps, 15 photostats and photographs, 1 broadside, 5 news clippings, 1 engraving, 1 miniature, and 1 reading machine. Additions have been made also to the Elihu Thomson Collection numbering some 400 miscellaneous items.

During the year 1,537 volumes, of which 1,521 were serial publications, and 4 pamphlets were disposed of by gift and sale. Taking these into consideration as well as additions, at the close of 1943 the number of volumes in the Library is 101,843, of which 70,269 are serials, 38,195 pamphlets, and 5,851 maps. Corresponding figures at the close of 1942 were: 102,674 volumes, of which 71,297 were serial publications, 37,746 pamphlets, and 5,832 maps.

The Committee acknowledges the receipt of gifts from the following persons and institutions: Elisabeth Achelis, Albany County Historical Association, American Academy of Arts and Letters, American Committee for International Wild Life Protection, American Council of Learned Societies, American Jewish Committee, American Mathematical Society, American Philosophical Association, American Russian Institute, Argentine Republic, Municipal Museum of Baltimore, Eric Temple Bell, Whitefield J. Bell, Jr., The British Council, Charles A. Browne, Henry S. Cadbury, Charles M. B. Cadwalader, Philip P. Calvert, Carl Schurz Memorial Foundation, Carnegie Corporation of New York, Carnegie Endowment for International Peace, Carnegie Foundation for the Advancement of Teaching, Carnegie Institution of Washington, Mrs. Joseph Carson, Gilbert Chinard, Mrs. John Candler Cobb, Colonial Society of Massachusetts, Committee of 1926 of Pennsylvania, Edwin G. Conklin, Cornell University, W. F. Davidson, Dominion Astrophysical Observatory, Luther P. Eisenhart, Engineering Foundation, Henry Ridgely Evans, Excavators' Club, Max Farrand, Francis A. Foster, Carroll Frey, A. F. Gegenheimer, General Education Board, Geographical Society of New South Wales, Geographical Society of Philadelphia, Georgia State Geological Survey, Greenwich Observatory, Miecislau Haiman, Hartford Seminary Foundation, Heye Foundation, His Majesty's Stationery Office, Mrs. Grace Miller Hitchcock, Illinois State Geological Survey, Indian Rights Association, Institute of Jewish Affairs, Instituto Panamericano de Bibliografia y Documentacion, Inter-

national Benjamin Franklin Society, Harold S. Jantz, Mrs. John Story Jenks, John Rylands Library, Kosciuszko Foundation, Lankenau Hospital, Frederic T. Lewis, Jorge A. Lines, William E. Lingelbach, Walton Brooks McDaniel, McGregor Library of the University of Virginia, Elmer D. Merrill, Republic of Mexico, Milbank Memorial Fund, Mississippi Geological Survey, Roland S. Morris, Arthur V. Morton, Muhlenberg College, National Research Council, New York Meteorological Observatory, New York Zoological Society, Peabody Museum, Penn Mutual Life Insurance Company, Commonwealth of Pennsylvania, Pennsylvania Forestry Association, Philadelphia Bibliographical Center, Philadelphia Museum of Art, Rhode Island Historical Society, Horace C. Richards, Rockefeller Foundation, A. S. W. Rosenbach, Royal Society of London, Miss Emma F. Sachse, San Fernando Instituto y Observatorio, Robert L. Schuyler, T. J. J. See, Mrs. Edward W. Smith, P. H. Waddell Smith, Social Science Research Council, Sociedad de Estudios Astronomicos y Geofisicas, Sociedad Mexicana de Historia Natural, Mrs. Florence Taylor, Elihu Thomson Estate, Union Catalog of Floridiana, Union of American Hebrew Congregations, U. S. Government, Universidad de Santo Domingo, University of Adelaide, University of Maryland, University of Pittsburgh, Vermont Historical Society, Viking Fund, Inc., Virginia State Library, Philip B. Wallace, Welch Medical Library, Johns Hopkins University, West Point Military Academy, James O. Wettereau, Widener Memorial School for Crippled Children, Herbert E. Winlock, David O. Woodbury, Woods Hole Oceanographic Institution, World Calendar Association, Zoological Society of Philadelphia. The Academy of Natural Sciences of Philadelphia placed on deposit 230 items. Specific reference to some of these donations appears in the list of accessions.

*Binding, Cataloguing, etc.*

During the year 1943, 340 volumes were bound and 116 rebound. There have been catalogued 556 titles; 553 analytics, 141 association items, 48 autographs, 17 bookplates, 2 broadsides, 4 incunabula, and 3 microfilms have been brought out; 215 items have been added to the file of material submitted by grantees. In addition to the routine cataloguing here noted, a large amount of manuscript work has been done. This has included the carding and filing of the year's accessions, as well as a continuation of the



calendaring of the Lesley, Lyman, and Thomson Collections, and the Society's own archives. Altogether, 5,818 cards have been added to the catalogue, of which 1,830 were L. C. cards and 3,988 were typed.

Numerous lists have been compiled to facilitate the surveying of the different classes of holdings. The sorting and listing of duplicates has been continued.

*Restoration of Manuscripts and Rare Books.*

The restoration of manuscripts was confined to the Peter Lesley and the Samuel George Morton Collections, and a small number of items in the Society's archives.

The poor condition of the draft of the Declaration of Independence in the Society's possession has troubled the staff for some time. Records show that the document was photographed, repaired after a fashion, and framed about 1898. Since that time considerable fading has taken place which, along with the crude paper patches used in the early restoration, makes some portions almost undecipherable. When the document was taken from storage to be exhibited in connection with the Jefferson Celebration, it was decided to have it examined by an expert to determine whether restoration by today's approved methods would be feasible. Mrs. Carolyn Horton was employed for this purpose. When the ink was tested for stability it was found to disappear completely with the application of water, which prohibited its use in removing the old repair slips, the first step toward any further restoration. While restoration might have been possible by the use of some other agent to remove the strips and the page repaired with a non-aqueous adhesive, it was the opinion of Mrs. Horton that the better course would be to leave the document in its present condition rather than to risk any further deterioration of the ink and paper. It was agreed to abide by this opinion. Fortunately, the photographic glass negatives made in 1898 are still intact, so that a reproduction from them is sharper than the original today.

An additional appropriation of \$500 from the B and B Fund was made to continue the repair of old leather books which had been started in 1942 under the care of Mrs. Helen A. Price.

*Photoduplication Service.*

The determination expressed in last year's Report to make every effort to continue the work of the photographic laboratory

has been made good, albeit not without some difficulties with respect to personnel. Notwithstanding this, in addition to the filming of the Lewis and Clark Journals for the Society's own files, 33 outside orders have been filled, comprising 4,835 frames of microfilm, 84 enlargement prints, and 126 lantern slides. Receipts were \$286.28. One of these orders merits special mention. Through the auspices of the U. S. State Department, the Free Library of Philadelphia was able to borrow about 100 scores of original Latin-American musical compositions with the privilege of making copies. The Society was asked to microfilm the collection, and has completed all but 10 of the works, totalling about 4,500 frames.

A gift from the American Mathematical Society of a Spencer Lens microfilm reader has enabled us to give better service to the patrons using the Franklin films.

*In-Use and Out-Use of the Library.*

During 1943 there were 323 recorded visitors, consulting 891 printed and 382 manuscript items. Microfilms of the Franklin Papers were consulted on seven occasions. Interlibrary loans continued to grow with 239 items lent compared with 216 in 1942. Members of the Society borrowed 18 volumes, and the staff 54. Twenty items were borrowed from other libraries. The long-time loans of 187 volumes on Assyriology to Brown University, and 10 volumes on botany to the Academy of Natural Sciences of Philadelphia were renewed.

In connection with the General Meeting of the Society in April, an exhibition was arranged in commemoration of the Two Hundredth Anniversary of the Birth of Thomas Jefferson which centered around his association with the American Philosophical Society, his public life in general, and the Declaration of Independence. Early illustrated works in natural history were used to form another exhibit which was made colorful by the display of plates in Catesby's *Natural History of Carolina*, Buffon's *Histoire Naturelle des Oiseaux*, and similar works. "The Americas as Seen by 17th and 18th Century Travellers" was the subject of a third exhibit which utilized plates of early travel books, such as William Bartram's *Travels through North and South Carolina*, Hennepin's *New Discovery of a Vast Country in America*, La Hontan's *New Voyages to North America*, de Rochefort's *Histoire Naturelle et Morale des Iles Antilles de l'Amerique*, and others.

The Society participated in exhibitions arranged by the University of Pennsylvania, the New Jersey State Museum, the Library of Congress, and the Société d'Histoire de la Revolution by lending several books and maps.

*Financial Statement.*

*Books and Binding and General Expenses.*

Carried forward from 1942 .....	\$ 4,274.32
Appropriation for 1943 .....	7,000.00
Special appropriation	
Transferred from Miscellaneous Fund .....	5,000.00
Transferred from Research Fund .....	20,000.00
	<hr/>
	\$36,274.32
Expended during 1943 .....	22,674.05
	<hr/>

Balance 12/31/43 ..... \$13,600.27

*Special Library Funds.*

Balances			Transferred	Balances
1/1/43	Income	Expended	to Principal	12/31/43
\$21,400.04	\$7,956.90	\$3,766.15	\$2,486.14	\$23,104.65

*Salaries.*

For 1943 ..... \$ 9,856.89



THE  
AMERICAN PHILOSOPHICAL SOCIETY

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LIBRARY BULLETIN

1943

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As a means of making the Library and its archives better known in the scholarly world, a *Bulletin* will in the future form a part of the Annual Report of the Library. It will include, besides introductory comments, discussions by scholars of significant current acquisitions and notable items in the older collections. Appearing first in the YEAR BOOK as an integral section of the Report of the Library, it will be issued subsequently as a separate for special distribution. In this way we hope to bring the riches of the Society's collections to the attention of its members and to scholars in general, and at the same time prepare the way for the successive publication by competent editors of its more important holdings.

The year 1943 brought unusually rich and varied additions to the Society's manuscript collections.<sup>1</sup> Among those here selected for special consideration because of their interest and significance are the following, the first three representing recent acquisitions, while the fourth is based on the older archival holdings: (1) four items, consisting of an off-the-record minute, Franklin's "Remark" in 1789 on the Albany Plan of Union, Jefferson's letter of April 30, 1775, on the publication of State Papers, and two early catalogues of the Library; (2) the journal of Benjamin Rush, his "common-place" book, and other Rush items; (3) the Hazard Papers, so significant for the early history of the United States Post Office; and (4) notes on the French translations of the "Forms of Government or Constitutions of the Several United States," 1778 and 1783.

<sup>1</sup> See list of accessions, p. 107.

# AN OFF-THE-RECORD-MINUTE OF THE SOCIETY

American Philosophical Society this Friday January 1781. Election day for two members

Members present—

Dr Bond  
Mr Littenhouse  
Mr Willson  
Rev. Dr Ewing  
Rev. Mr White  
Rev. Mr Duffield  
Rev. Mr Kunze  
Mr Matlack  
Mr Owen Biddle.  
Mr Clement Biddle  
Mr Hopkinson  
Mr McKean  
Mr George Bryan  
Mr De Meabois  
Dr Th<sup>o</sup> Bond Jun.  
Dr Hutchinson  
Mr Jas Davidson  
Col Nicola  
Dr S. Duffield  
Mr Du Simitiere

Persons proposed and by whom.

Col. Feltizer by Rev. Dr Ewing 10.  
Mr Rob<sup>t</sup> Davidson by ditto.  
\* the Marquis de la Fayette by Dr Bond unanimous  
Rev. Bartholomew Booth by ditto 10  
Dr Benjamin Duffield by ditto  
Dr George Lagan by ditto  
\* Mr Ebenezer Hazard by Mr Littenhouse 15  
\* the Chevalier de Chateaux by Mr Matlack unanimous  
\* Mr. Thomas Ben. Esq. by ditto  
\* Jared Ingham Esq. by Mr Bond 10  
Mr Joshua Wallace by Mr Owen Biddle  
Mr James Cannon by ditto  
\* Mr Isaac Gray by ditto  
John Deale Boardley Esq. by Rev. Mr White  
\* Dr Hugh Shield by James Willson Esq.  
Mr George Clemer by ditto  
Dr Matthew Maury surj. mach. by Col. Nicola  
Mr John Hancock by ditto  
Jonathan Serjeant Esq. by Dr Hutchinson  
Thomas Payne Esq. by ditto  
James Wilkinson Esq. by Jon. B. Smith Esq.

13 the names provided by a \* were elected. the members after some show the number of votes each had, but could not procure them for all. it requires three fourths of the company present to make a new member and there can be no election unless twenty members are present. these two names who have a bar drawn over them had been proposed as usual, but at the time the election was carrying on they were privately suppressed by the gentlemen who had proposed them, which being known, it was determined after debate that they had no right to withdraw them privately but that it should be done with the unanimous consent of the members present, upon which they were ballotted for and both rejected.

This extraordinary memorandum of the meeting of the Society on January 19, 1781, at which Lafayette, Hazard, and five others were elected, tells its own story. The formal minutes are rather colorless by comparison. In accordance with the custom of the Society from the beginning, they give the names of only those who were elected, make no mention of the other nominees, of the number of votes cast, or of such special action as that on Thomas Payne [*sic*] Esq. The unofficial minute is obviously the more interesting. The fact that J. B. Smith is not mentioned as present would point to him as the author, but the handwriting is more nearly that of Lewis Nicola, the friend of Ebenezer Hazard, among whose papers the Minute was found.

#### FRANKLIN THIRTY-FIVE YEARS LATER ON THE ALBANY PLAN OF UNION

On June 10, 1788, Mathew Carey, the printer of the *American Museum*, requested Franklin to write a recommendation of his paper. Franklin in a letter on the same date declined, saying:

Such a Work if well executed, recommends itself, and needs no other Recommendation; and if not well executed, will not be help'd by any other, whoever it may be sign'd by,—As a principal Use of it is to preserve fugitive Pieces; I think you would do well not to fill any part of it with Extracts from Collections already made such as the Philos. Transactions where they are already preserv'd.

Instead of the recommendation Carey requested, Franklin agreed to the publication of some of his works, including his comments on the Albany Plan. In a letter of February 9, 1789, he wrote:

Sir

I thank you for the Opportunity you propose to give me of making Alterations in those old Pieces of mine which you intend to republish in your Museum. I have no Inclination to make any Changes in them; but should like to see the Proof Sheet, supposing your Copies may possibly be incorrect.—And if you have no Objection, you may follow the Albany Plan with the enclos'd *Remark*, but not as from me.

I am, Sir,

Your humble Servant  
(signature cut off)

[February 9, 1789]  
Add: Mr. Matthew Carey  
Printer of the Museum

The "Remark" referred to in the letter is also in Franklin's hand, though, in accordance with Franklin's request, its authorship was not revealed as published in the *American Museum* of April 1789.

*Remark, Feb. 9, 1789.*

On Reflection it now seems probable, that if the foregoing Plan or something like it, had been adopted and carried into Execution, the subsequent Separation of the Colonies from the Mother Country might not so soon have happened, nor the Mischiefs suffered on both sides have occurred perhaps during another Century. For the Colonies, if so united, would have really been, as they then thought themselves, sufficient to their own Defences, and being trusted with it, as by the Plan, an Army from Britain, for that Purpose would have been unnecessary. The Pretences for framing the Stamp-Act would then not have existed nor the other Projects for drawing a Revenue from America to Britain by Acts of Parliament, which were the Cause of the Breach, & attended with such terrible Expence of Blood and Treasure; so that the different Parts of the Empire might still have remained in Peace and Union. But the Fate of this Plan was singular. For After many Days thorough Discussion of all its Parts in Congress it was unanimously agreed to, and Copies ordered to be sent to the Assembly of each Province for Concurrence, and one to the Ministry in England for the Approbation of the Crown. The Crown disapprov'd it, as having plac'd too much weight in the democratic Part of the Constitution; and every Assembly as having allow'd too much to Prerogative. So it was totally rejected.

The Library prizes these items not only as rare Frankliniana, but as a revealing commentary by Franklin toward the end of his long and momentous life on his famous Plan of Union, which after many vicissitudes became the basis of the deliberations for the government of the Thirteen States. Approved by the Albany Congress in 1754, it was rejected by the Colonies. Twenty-two years later, when the Second Continental Congress adopted the Declaration of Independence and resolved itself into a committee of the whole "to take into consideration the state of America," Franklin read a revision of his Albany Plan under the title "Articles of Confederation and Perpetual Union for the United Colonies of North America." A number of the leading members of the Congress, including Jefferson, were ready to consider their adoption then and there, but others objected. However, the chairman of the Committee on Union, Dickinson of Pennsylvania, made



them the basis of the Committee's deliberations and "some of the main features of the Articles of Confederation are found word for word in Franklin's draft" (Farrand).

### JEFFERSON ON THE PUBLICATION OF STATE PAPERS

In a letter addressed to Ebenezer Hazard, Esq., Jefferson wrote:  
Virginia April 30.1775.

Sir

Your letter of Aug. 23, 1774 & Proposals for collecting and publishing the American state papers I have received. it is an undertaking of great utility to the continent in general, as it will not only contribute to the information of all those concerned in the administration of government, but will furnish to any historical genius which may happen to arise those materials which he would otherwise acquire with great difficulty & perhaps not acquire at all. Any thing in my power I will most gladly contribute to the compilation. I will direct office copies of our charters, resolutions of assembly etc. and of our treaty with the commonwealth of England to be immediately made out, and will forward them by the best means I can. I had before began a perusal of our antient records, which however I can only carry on when my attendance in assembly calls me to our capital from which my ordinary residence is remote. my progress in this will of course be slow. but it is probable it will enable me to bring into light some other valuable papers which do not come within any description I can at present make out to the clerk. as fast as any such occur I will forward them to you. . . if any thing further should occur in which I can be useful, be pleased to impart it to me with freedom, & my best endeavors shall be exerted to shew you how much I wish to see such a work forwarded. . . I am Sir

Your very humble serv<sup>t</sup>.

TH. JEFFERSON

To  
Ebenezer Hazard, esq.  
at New-York

This letter by the first Secretary of State is of especial interest in this anniversary year of Thomas Jefferson, for it definitely implies the principle of "open covenants" and reveals Jefferson and Hazard as the earliest pioneers in the demand for the publication of official documents, a subject over which controversies have so frequently arisen. Even if diplomacy cannot "proceed always frankly and in the public view," as Woodrow Wilson proposed in

the first of his Fourteen Points, the right of the people to know the results was apparently accepted by Jefferson as inalienable. Hitherto unpublished, this letter, along with another also arising out of Hazard's proposal, merits not only a permanent place in the historiography of the publication of State and Foreign Office records, but its ideas should be adopted as the guiding principle in the much debated question of the secrecy of State and Foreign Office documents. Just what is meant by "our treaty with the commonwealth of England" and certain other implications cannot be discussed here.

### THE EARLIEST KNOWN CATALOGUES OF THE LIBRARY

Among certain volumes and papers relating especially to the archives of the Society itself, and discovered during the summer in their transfer from the Hall of the Society to the present Library, were two new, and hitherto unknown, manuscript catalogues of the Library, with several minutes and short reports about them. The catalogues differ radically from the others, or later ones, in that size and format rather than subject or content are the basis for the classification of the books. One of the catalogues, the one in large folio, is plainly the older. It goes into considerably more detail as to titles and description of the books. The second, in small folio, is not only abridged as to the titles but departs quite a little in the order of the arrangement of the books; the entries carry only essential bibliographical matter of the works as a whole and omit the descriptions of the separate volumes. Publication of the former was apparently planned, for a neatly printed proof sheet of the first page is included with the manuscript. Heretofore, the earliest known catalogue of the Society's Library was the two-volume work prepared by Dr. Nicholas Collin in 1799. In it the books are not arranged according to size, but classified by subjects.

Since the Collin catalogue has for many years been regarded as the first catalogue, this unexpected appearance of the other two, arranged on an entirely different plan, presents an historical problem with a number of very intriguing questions. The obvious source for their solution was, of course, the Minutes of the Society. A study of the Minutes published in 1884 clarified some of the questions, but left others more complicated than before. Recourse

to the manuscript Minutes helped, but these, too, proved inadequate on several important points. Fortunately the loose papers, chiefly reports, furnish the missing information necessary for at least a tentative solution of the problem.

The logical starting point for this preliminary study of the early catalogues of the Society's Library is the winter of 1790, when the books were removed from the place where they then were to the Hall of the Society. At the meeting of February 5, 1790, it was

Ordered that the Curators shall as soon as may be, take a complete catalogue of, and duly arrange, the Society's Library, the various specimens of Natural History, and other articles of their Museum; and shall remove them from the place in which they are at present, to one of the chambers in the Society's Building.

Two years later, on February 17, 1792, the Minutes record that

The Report of the Committee relative to the Society's Library, was brought in, and the following articles were agreed to, and confirmed:—

1. That a complete Catalogue of all the Books, Instruments, Models, & specimens of Natural History, belonging to the Society, be made by the Curators; and that the Catalogue of the Books be printed in a convenient Pamphlet. . . .

This is followed on January 18, 1793, by the appointment of two persons "who, together with the Curators, shall be a Committee for revising, and printing a Catalogue of the Books, Philosophical Apparatus, Models of Machines, and the more important specimens of Natural History belonging to the Society."

Three years later, on July 15, 1796, "Mr. Peale, one of the Curators laid before the Society the draught of a catalogue of the books belonging to the Society." At the same time John Bleakley and Moreau de St. Méry were appointed a Committee "to assist the Curators in comparing the above with the titles of the books and correcting the same where necessary."

Several months later, on October 21, 1796,

the Committee appointed to consider the expediency, etc., of printing the catalogue . . . reported that they think the measure expedient and that the expence of printing 500 copies the title pages in full, would be about eighty dollars.—Ordered that the above Committee are desired to revise the Catalogue, to

abridge the titles . . . and to particularize the edition of each work.

The next reference to the Catalogue occurs on April 21, 1797. It reads:

The Committee appointed to prepare a Catalogue of the Library reported progress.

From the report itself, which does not appear in the Minutes, it is evident

That they have completed the Catalogue, except as to the Pamphlets. . . .

Two weeks later, on May 5, a written report signed by Rich. P. Smith and Sam. H. Smith was submitted. It is not given in the Minutes, but was found with the Catalogue and reads:

That they have completed the arrangement of all the Books and Pamphlets.

That they are in readiness to be put into the hands of the binder.

That several Estimates have been obtained of the probable expense of binding, the lowest of which amounts to 120 dollars. . . .

No progress has been made in enumerating, for the Catalogue, the subjects of Natural History and various articles of mechanism. The Committee, impressed with the necessity of accuracy in this department, recommend the appointment of Committees on these several objects.

May 5, 1797

Rich. P. Smith  
Sam. H. Smith

The Catalogue now seemed to be nearing completion. But there is no record of the appointment of the Committees or, indeed, of any work on the Catalogue during the year. Not till March 16, 1798, does the subject appear again, when it was "Resolved that a Com<sup>o</sup>. be appointed to enquire into the state of the Catalogue and report at the next meeting. S. H. Smith appointed for said purpose." Weeks later, at the stated meeting of April 6, "S. H. Smith reported that the Copy of the Catalogue of books belonging to the Society was probably lost." Curiously enough, nothing further is said in the Minutes about so important a matter as the disappearance of the Catalogue, the preparation of which had occupied the attention of the Society, more or less intermittently, for a period of over eight years. On the other hand,

the original copy of S. H. Smith's report is more explicit than the secretary's minutes. It says:

The Committee appointed to enquire into the state of the Catalogue reports, that during the summer of the last year the Catalogue was completed, and fairly transcribed. In consequence of the dispersion produced by the yellow fever, it was not at that time reported to the Society. It was lodged in the hands of Richard P. Smith who fell a victim to the disease. Ineffectual search has since been made among his papers for it; and it is presumed that it is lost.

Sam. H. Smith

April 6th, 1798.

Apparently taking the loss of the Catalogue during the confusion of the yellow fever epidemic as final, someone made another in the course of the three months that followed. On the first folio of the smaller Catalogue discovered last summer is the following title:

CATALOGUE  
of the Library belonging to the  
AMERICAN PHILOSOPHICAL SOCIETY  
held at Philadelphia for promoting useful  
Knowledge  
Taken July 1798

As already noted, the basis of the classification of the books is the same as that employed in the other and earlier catalogue, and the order, though departing considerably from that of the larger one, is nevertheless so very like it in other respects as to lead to the assumption that, if the "lost" catalogue was not found, the new one of July 1798 was made by someone familiar with the steps in the making of the earlier catalogue. It embodies precisely the instructions given the Committee on October 21, 1796, "to revise the Catalogue, to abridge the titles . . . and to particularize the edition of each work."

The definitive comparison of the two catalogues and their relationship to each other and to that of Dr. Collin of 1799 will have to await further research. In the meantime the rest of the story of the Collin catalogue may throw some light on the problem. In contrast with the long-drawn-out history of the earlier catalogue, that prepared by Collin developed with remarkable speed.

On January 18, 1799, the following resolution providing for a new Committee on the Catalogue was passed: "Resolved that a Committee be appointed to prepare a Catalogue of the Books, and Philosophical apparatus of the Society. The Committee: Mr. Davidson, Mr. Peale, & Dr. Collin." The Committee set about its work in real earnest, for on July 19, 1799, the Society instructed the Secretary "to request Dr. Collin to complete the Catalogue of the Books . . . by the next meeting." On August 16 he reported "that he had made considerable progress in the arrangement of the Books . . . and in the formation of a Catalogue." On December 6 he requested a "special meeting" for 6 p. m. of the following Friday, December 13, for the purpose of receiving the Catalogue and report of the Committee. The special meeting was duly called, and the following action on the Catalogue was taken:

Dr. Collin of the Committee to arrange the books of the Society & form a Catalogue—Reported that the same was finished & explained the general principles upon which it was formed—

Resolved that the Thanks of the Society be returned to Dr. Collin for the industry & talents manifested in forming the Catalogue.

Ordered that the above Resolution be copied into the Catalogue by the Secretary.

Resolved that the Report & Catalogue, as delivered by Dr. Collin, be accepted.

*Dr. Collin's Report on the Catalogue*

*Read & accepted Decem<sup>r</sup>. 13<sup>th</sup>. 1799.*

Report on The Catalogue accompanying the presentation of the same, by The Committee appointed to form it.

Human Knowledge embraces in its present advanced State a great variety of objects; and these have very extensive mutual relations. A systematic arrangement of sciences and arts is therefore itself a science; and a Philosophical Catalogue of books is a conspicuous [*sic*] pattern, very useful, especially for young students. Philosophical Societies, moreover, owe the Public, such examples. At the same time no perfection can be expected in particulars; but improvements are to keep pace with the continually progressive discoveries of the Human Mind.

We have endeavoured to produce a better order than in any catalogues hitherto seen in this country. *First*, the kindred subjects are arranged in separate respective classes. *Secondly*, these classes are divided into families of nearer connection.

*Thirdly* Miscellanies are brought into a readier view [*sic*], by placing those of a kind with their respectively kindred sciences and arts, for ex. Medical, Mathem. etc.: and by distinguishing the more varied under titles of Encyclopedias, Transactions of Societies, and the like. *Fourthly* the order of classes is founded partly on congeniality; and partly on a natural precedence: In the latter view we begin with those sciences which intimately concern the moral faculties of mankind, at the head of which is Religion, taken in its general sense, as the relation between god and his creatures: and we place agriculture with the useful arts before polite learning as it is called. Nevertheless we have in some cases omitted nice distinctions, to avoid too numerous divisions.

This Method renders a speedy finding of any books more easy than the common mode, by which the index of names and corresponding numbers do not immediately determine the place in cases when the same person is author of different works, i.e. Theology, Botany, Astronomy etc. Whereas a general Index of classes and families, and numerical marks of the books in each, with the names of the authors prevent all ambiguity. Besides, the addition of names will be needless, until the Library has attained a very considerable growth.

While the Catalogue is manuscript, blanks in the several departments are necessary for the gradual reception of new books. We have accordingly left such, on a probable estimation of the kinds and numbers of acquisitions, and of the time which may elapse before its being printed.

The Titles are in many cases amply stated, in order to show the principal objects, and because this mode conveys a valuable information in Literary History. The names of Donors are also added on principles of gratitude, and encouragement of such public munificence.

It is painful to mark several valuable books as lost. Duplicates and greater numbers of books and pamphlets are not inserted, as some of them may be advantageously sold or exchanged. Several volumes of Miscellanies are also left out, because some of the parts are duplicates of pieces inserted, and others are compiled without judgment.

This remarkable Report, taken in connection with Dr. Collin's Catalogue, represents not only the first effort in the Society to classify its books on a new basis, but also one of the early reasoned arguments in favor of classification on the basis of subject matter. To determine whether Dr. Collin succeeded in his endeavor "to produce a better order than in any catalogue hitherto seen in this country," would involve a comparison with Dr. Clap's famous *Catalogue of the Library of Yale-College in New Haven*, of 1743;

the Harvard College *Catalogue Librorum Bibliothecæ* of 1723 and its supplements of 1725 and 1735; and Franklin's *Catalogue of Books belonging to the Library Company, Philadelphia*, printed in 1741. It is not without interest that the last entry in the report on the Yale library kept by Dr. Clap records a gift of 1753 by Benjamin Franklin.

William E. Lingelbach

### RUSH MANUSCRIPTS

One of the most notable collections of American historical autographs to appear for some time was the Alexander Biddle Papers. The nucleus of this collection was the material inherited by Mrs. Biddle, the former Julia Williams Rush, which included the papers of her grandfather, Benjamin Rush, distinguished physician of the American Revolution, signer of the Declaration of Independence, and vice president of the American Philosophical Society.

In 1800 Dr. Rush, then in his fifty-fourth year, wrote a series of memoranda about his life intended as a record for his children, but not meant for publication, which he entitled: Travels through life, or, An account of sundry Incidents and Events in the life of Benjamin Rush, born Decem<sup>r</sup> 24, 1745, old Style.—written for the Use of his Children.

1  
Travels through life  
 or  
 An account of sundry  
 Incidents and Events in  
 the life of Benjamin Rush  
 born Decem<sup>r</sup> 24, 1745 old style. —  
 written for the Use of his  
Children.

This document, consisting of eight small notebooks, is now in the possession of the Society, having been acquired along with a Commonplace Book kept by Dr. Rush from 1792 to 1813, and a few



other kindred items from the aforementioned collection. It is a frank and thoughtful autobiography garnished with comments of all sorts on his times, his contemporaries, and his controversies. A long and important passage gives his own characterizations of each of the members of Congress who signed the Declaration of Independence. These were written originally during the Revolutionary War but received subsequent additions. Of himself he says only, "He aimed well." The *Commonplace Book*, of almost equal importance, contains a wide-ranging miscellany of current events, reminiscences, personal comment, and religious and philosophical meditation.

Shortly after Rush's death, as evidenced by two letters from Richard Rush to his brother James in May 1814, his sons took steps toward publishing the autobiography, or at least as much of the material as might be suitable for publication at the time. One of them marked many passages for deletion, adding in some places his own notes explaining the proposed omissions. One of the longest of these suppressed sections concerns Rush's controversy with the Army medical service. A fair copy in longhand was made from the original manuscript as edited, which includes some material not in the original as the latter came to the Society. However, in spite of all these preparations something prevented publication at that time, and not until 1905 was the material made available in print. In that year Mr. Louis Alexander Biddle, Rush's great-grandson, published *A Memorial containing Travels Through Life or Sundry Incidents in the Life of Dr. Benjamin Rush . . . also Extracts from His Commonplace Book as well as A Short History of the Rush Family in Pennsylvania*.<sup>1</sup>

Mr. Biddle had the *Memorial* printed privately in a very limited edition from the emendated fair copy apparently without considering that some of the expunged passages are of value for historical study and, after the lapse of time, could have been published without impropriety. While it is true that much of the historical information included in it may be found also in Rush's letters, there does appear to be a need for a scholarly and complete edition of this valuable and highly readable account of Rush's life as a student of medicine in Great Britain, his practice in Philadelphia, his services in the Revolution and in Congress, and his contributions to the civic life of Philadelphia, which will be more

<sup>1</sup> Lanoraie, 1905.

easily accessible than the privately printed edition to those interested in Revolutionary times and in the history of medicine in America. The Society has in mind to publish such a definitive edition as soon as conditions permit.

Two related items were also acquired—the one, a letter from William Rush to his brother James, October 1, 1848, relative to that part of their father's autobiography which pertains to the signers of the Declaration of Independence; and the other, a small commonplace book kept by Samuel Rush, another son of Benjamin, from February 28 to September 18, 1859, twenty pages of which are devoted to biographical material about his father.

George W. Corner

#### NOTES ON SOME EARLY POST OFFICE RECORDS

In 1928 Michael Kraus published his *Intercolonial Aspects of American Culture on the Eve of the Revolution*, a thesis which challenged the generally accepted view that the American colonies were linked together only by the bonds of the British government and that they "had usually but little intercourse with one another." Yet, despite Mr. Kraus' concern with elements which fostered intercolonial communication and which aided the growing consciousness of a common destiny, he, like many others, overlooked one of the chief implements of social intercourse—the post office. To be sure, Mr. Kraus was chiefly concerned with proofs that the colonials were much better acquainted with each other and exchanged ideas and customs much more frequently than had been generally supposed: he was not primarily concerned with the instrumentalities that brought these things about. In the same year, Ruth Lapham Butler brought out her competent study entitled *Doctor Franklin, Postmaster General*, based in part upon post office records in the American Philosophical Society. But Miss Butler was chiefly concerned with the post office as an organism and with the influence of Franklin upon its development in this country; she was not primarily interested in the social values of the instrument itself. The need still exists for a study of the role of the post office in promoting the cultural growth of the colonies and in supporting the consciousness of a common nationality—its role as, in a sense, a far-flung learned society whose representatives did much more than deliver the mail.

Its delivery of the mail, in an age when all communication travelled the post-roads whether in the form of print or of personal correspondence, was all-important. But in the performance of this function the postal officials and employees served as cultural foci, gathering and exchanging information, replying to questionnaires, engaging in privately-supported missions, or supplying rural newspaper printers with extracts from city journals—while the mails were in consequence delayed. But no comment about the cultural role of the early post office could possibly be so significant as the fact that Franklin himself devoted thirty-seven years of arduous labor to this instrument of intellectual intercourse. In his hands, it was an implement of cultural growth and of political union. It is significant, too, that it was one of his successors as postmaster general, Ebenezer Hazard, who provided us with our first published collection of American State Papers.

New materials for the study of colonial communication have been acquired by the Society through the purchase of the Ebenezer Hazard Collection, small in size but rich in historical significance. In addition to the commission signed by Benjamin Franklin and issued to Hazard as deputy postmaster of New York, dated September 21, 1775, together with various commissions, military passes, and letters pertaining to postal affairs and bearing such signatures as those of John Hancock, Samuel Huntington, and George Washington, the collection embraces the following highly important records of the post office at Philadelphia on the eve of the American Revolution: (1) "Letters sent from the Post Office at Philadelphia," October 18, 1764 to September 22, 1767, 64 ff.; (2) "Letters received into the Post Office at Philadelphia," May 12, 1767 to April 21, 1768, 22 ff. The former record furnishes the historian with several categories of information: the name of the office to which letters were sent, the number of unpaid letters, the number of paid letters, the number of free letters, and the date bills were dispatched. The second and third of these categories are subdivided in order to give the number of single, double or treble letters and the number of packets. To take a single day, February 28, 1767,<sup>1</sup> we find that mail was dispatched to seventeen northern towns—Quebeck, Newbury, Albany, Middletown, Portsmouth, Newport, Hartford, New Haven, Stratford, Newark, Elizabethtown, Woodbridge, Brunswick, Princeton, Trenton, Boston, and New York. An analysis of the statistics furnished on this day provides

<sup>1</sup> See p. 87.

an interesting speculation concerning the volume of mail to each of these centers. Of the total of 105 single letters sent to 17 towns, 64 went to New York, 10 to Boston, 8 to Newport, 4 each to Trenton and Newbury, and 3 to Princeton; of the 25 double letters dispatched to 7 towns, 13 went to New York, and 6 to Newport; of the 6 triple letters dispatched to 2 places, 5 went to New York, and 1 to Newport; of the 7 packets dispatched to 4 places, 4 went to New York. Clearly, the volume of communication at this period was with New York. The similar analysis of statistics presented in the record of letters received at Philadelphia in the years 1767-1768 reveals similar evidence.

The Hazard Collection, which includes such interesting documents as the letter from Thomas Jefferson of April 30, 1775, concerning Hazard's "proposals for collecting and publishing the American State Papers," an enterprise which, at its completion, brought forth another letter from Jefferson to Hazard on February 18, 1791, is a significant addition to the materials relating to the early history of the American post office which have long since been in the custody of the Society in the Franklin Papers. The post office records in the Franklin Papers, which were used by Miss Butler in her monograph, are chiefly the following: ledgers covering the dates October 5, 1737-September 29, 1742 and September 29, 1742-1753; accounts drawn out November 1743; accounts April 18, 1744 (with two entries in November 1746—alphabetical list of letters received); accounts 1744-1748 (?); account of letters received into the post office at Philadelphia March 30, 1757 to October 5, 1764—the last, being all in manuscript, resembling the printed forms for the similar record acquired in the Hazard collection for the dates May 12, 1767 to April 21, 1768.

One of the most frequent abuses of colonial mails that Franklin and others sought to correct was the practice of "breaking bulk" on the part of masters of packet boats. Among the recent acquisitions of the Society is an extremely interesting document in the handwriting of Franklin which has to do with this practice. Aiming to correct the abuse, it provides a good picture of what sometimes happened upon the arrival of the packet vessel: "it has been customary for Numbers of People to crowd on board Vessels newly arrived in this Port, and into the Houses of the Captains, or Merchants to whom the same belong or are consigned, in quest of Letters, Packets, &c and under Pretence of taking care of the

# LETTERS *sent from the Post-Office at Philadelphia*

Date of the Bills sent.	To what Office the Letters were sent.	Number of unpaid Letters.						Number of paid Letters.						Free Letters.			
		Single.	Double.	Treble.	Pacquet.	Sums unpaid.		Single.	Double.	Treble.	Pacquet.	Sums paid.		Single.	Double.	Treble.	Pacquet.
						Dwt.	Gr.					Dwt.	Gr.				
1767																	
Feb. 26	Chester.....	2	...	...	...	13	8										
28	Quebeck.....	1	...	...	...	7	8										
	Newbury.....	4	..	...	...	20	16										
	Albany.....	...	...	...	1	28											
	Middletown...	2	2	...	...	30											
	Portsmouth ..	1	1	...	...	15	8										
	Newport.....	8	6	1	...	102											
	Hartford.....	1	1	...	...	15	8										
	N Haven.....	1	...	...	...	3	8										
	Stratford.....	2	...	...	...	6	16										
	Newark.....	...	...	...	1	12	16										
	Elizabethtown.	1	...	...	...	2	16										
	Woodbridge...	1	...	...	...	2											
	Brunswick....	2	..	..	..	2	16										
	Princetown...	3	...	...	...	4											
	Trenton.....	4	1	...	...	8	16										
	Boston .....	10	1	...	1	75	8	1	...	...	...	4					
	New York ...	64	13	5	4	280	...	3	...	...	...	6					
Mar. 2	Marlborough..	3	...	...	...	8											
	Baltimore.....	5	...	...	...	16	...	1	...	...	...	2	16				
	Norfolk.....	11	2	...	...	85	8										
	Williamsburg.	6	1	...	...	34	16										
	Annapolis....	4	1	...	...	16	..	1	...	...	..	2	16				
	Urbanna.....	1	...	...	...	4											
	Frederick <sup>a</sup> ...	2	...	...	...	6	16										
	Yorktown.....	2	...	...	...	12											
	Hodbie Hole..	6	1	...	...	32	16										
	Alexandria...	2	...	...	...	6	16										
	Hampton.....	1	...	...	...	5	8										
	Charlestown ..	5	3	1	...	30	16										
	Baltimore.....	5	...	...	...	13	8										
4	Albany .....	1	...	...	...	5	8										
	Hartford.....	1	...	...	...	4	16					15	8				

Letters of their Acquaintance dividing the Bag among themselves in a disorderly Manner, and in such Hurry & Confusion that it cannot afterwards be known by whom any Letter that is missing was taken up, and evil-minded Persons have made use of such Opportunities to pocket and embezzle Letters of consequence, and either destroy them or delay the Delivery a long time, to the great Damage & Injury of those to whom they were directed. . . ."

Sixty years ago when Henry Adams was writing *The History of the United States During the Administration of Thomas Jefferson*, he estimated that in 1800 an average of one letter per year per adult inhabitant was carried in the mails. He wanted to know how this average compared with that of a half a century earlier when Franklin organized the postal system of the Colonies, but concluded that "no record was preserved of the number of letters then carried in proportion to the population." The Ebenezer Hazard collection, together with the post office materials in the Franklin Papers, furnishes a part of the answer that Adams and others have waited for.

Julian P. Boyd

NOTES ON THE FRENCH TRANSLATIONS OF THE  
"FORMS OF GOVERNMENT OR CONSTITU-  
TIONS OF THE SEVERAL UNITED  
STATES" 1778 AND 1783

An investigation begun as a textual comparison between the 1789 French *Déclaration des droits de l'homme et du citoyen* and the American "Bills of Rights" adopted before 1789, has branched out into unexpected directions and has led the author of this note into an extraordinary bibliographical maze. At first, it was simply intended, contrary to the methods followed by most students of the problem, including Georg Jellinek and Max Farrand,<sup>1</sup> to compare the French text not with the English originals but with the French translations available to the members of the special Committee on the *Déclaration* appointed by the Assemblée Nationale. It soon appeared, however, that it was also necessary to compare the translations with the original documents, and this simple pro-

<sup>1</sup> The *Declaration of the Rights of Man and of Citizens* . . . by Georg Jellinek; translated by Max Farrand, and revised by the author. New York, 1901.

cedure resulted in various and complicated difficulties. No satisfactory solutions of the several problems encountered has been reached: the fragmentary results attained in the course of this preliminary exploration are presented here without any pretense to completeness, and most of the documents constituting the evidence in the case had to be reserved for further publication. But even this brief and desultory outline may throw some light upon a curious episode of the Franklin mission and show the desirability of making a thorough and complete survey of the printing of the early American constitutions and "forms of government."

## I

THE *Recueil* OF 1778

At the end of the year 1778 a paper bound volume of 370 pages was published in Paris with the following title taken from the copy in the Library of the American Philosophical Society:

Recueil des Loix Constitutives des Colonies Angloises, Confédérées sous la Dénomination d'ÉTATS-UNIS de l'Amérique-Septentrionale. Auquel on a joint les Actes d'Indépendance, de Confédération & autres Actes du Congrès général, traduit de l'Anglois. Dédié à M. le Docteur FRANKLIN. A Philadelphie, Et se vend à Paris, rue Dauphine, Chez Cellot & Jombert, fils jeune, Libraires, la seconde porte cochère à droite, au fond de la Cour. M.DCC.LXXVIII. 12 p. + 370. 9 1/2 cm. by 16.

The Library also has another edition, 12 p. + 370, 10½ cm. by 17, with an identical title, but marked as printed *en Suisse*. *Chez Les Libraires Associés*.

To both editions is prefixed a dedicatory epistle to *Monsieur le Docteur Franklin* and simply signed REGNIER.

These editions are listed in Sabin; they have also been described very imperfectly by Bernard Faÿ who seems to have used second hand information (*Bibliographie critique des Ouvrages français relatifs aux Etats-Unis* (1770-1800), p. 11 and 17, Paris, 1925). The first edition is barely mentioned by Luther S. Livingston in *Franklin and his Press at Passy*, p. 186, New York, 1914. The second is not even listed.

The "Swiss" edition is obviously a pirated reprint of the "Philadelphie" edition, which is itself a pirated reprint and compilation of documents already published. The whole story of the

shameless fabrication can be reconstructed almost completely from documents in the Franklin Papers preserved by the American Philosophical Society.

Among the most eminent French people who welcomed enthusiastically Dr. Franklin when he arrived in Paris in January 1777, were Louis-Alexandre, duc de la Roche-Guyon et de la Rochefoucauld d'Enville, born in 1743, and his mother the dowager Duchesse d'Enville. The young Duke had been brought up by his grandfather Alexandre de la Rochefoucauld who had become famous through his independent spirit and his mother, a friend of the *philosophes*, and a great admirer of Voltaire. Her salon had become the meeting place of the "Economistes," Turgot, Quesnay, abbé Baudeau. She had been declared by Diderot, "one of the most excellent women I have ever met." Louis-Alexandre, who shared the interests of his mother, was a student of government and, as early as 1762, had written a memoir on the "Histoire du gouvernement, des mœurs, des usages et des lois de Genève."<sup>1</sup>

The unpublished letters of La Rochefoucauld d'Enville to Benjamin Franklin extend over a period of over 10 years and deserve separate publication. I shall simply sum up here the indications that can be derived from them concerning our subject.

It appears that, even before Franklin's arrival in Paris, the duc Louis-Alexandre had been closely associated with a semi-clandestine periodical publication begun in 1776, and entitled *Les Affaires de l'Angleterre et de l'Amérique*. It was supposed to be printed in Antwerp but was really printed in Paris, perhaps with the tacit approval of the Ministère des Affaires Etrangères, and certainly by friends of the American cause. Besides official documents dealing with the new developments in America, each number contained a letter written by a mysterious "Banquier de Londres" who most probably was La Rochefoucauld d'Enville. A complete study of the periodical cannot be undertaken here: a few points may suffice. Volume IV, No. XVII, pp. lx-cxxj, of *Les Affaires de l'Angleterre et de l'Amérique*, as an appendix to a letter from the "London banker," dated February 24, 1777, contains a full translation of the *Constitution de la République de Pensylvanie*, and gives in footnotes the *Projet d'une forme de Gouvernement pour l'Etat de*

<sup>1</sup> There is no separate biography of La Rochefoucauld d'Enville; interesting indications are to be found in his cousin's biography. See *La Rochefoucauld-Liancourt*, by Ferdinand Dreyfus. Paris, 1905.



*Pensylvanie, imprimé pour mettre les habitans en état de communiquer leurs remarques.*—Juillet, 1776.

On the other hand, an undated letter of La Rochefoucauld to Du Bourg preserved in the Franklin Papers mentions the borrowing from Franklin of *l'Extrait des Journaux* and *Les Minutes of the Pennsylvania Convention*. In another letter, "Le duc de la Rochefoucauld pays his respectful compliments to Doctor Franklyn and begs [*sic*] from him the favour of having for a few moments the Minutes of the Convention held at Philadelphia for the Pennsylvania Legislature."

Other letters show that La Rochefoucauld obtained from Franklin the texts of the constitutions of Delaware and Maryland. During the course of the year *Les Affaires de l'Angleterre et de l'Amérique* gave the translation of the constitutions of Pennsylvania, New Jersey, Virginia, Delaware, South Carolina, and Maryland. Every one of them would deserve a separate study: we shall limit our remarks to Pennsylvania and Virginia.

The French text of the Pennsylvania constitution is copiously annotated; most of the notes were probably written by the editor, but one of them at least entitled *Note d'un Américain* cannot be lightly dismissed. It is here reprinted in full:

*Note d'un Américain.*

On sera peut-être surpris de trouver une distinction d'*hommes libres* dans un pays où l'on croit que tous les hommes le sont. Il en existe encore en Amérique deux classes qui ne le sont pas.

L'une entièrement esclave, ce sont les negres. A la vérité plusieurs & même la plus grande partie des Colonies, ont toujours été opposées à leur importation, & souvent ont fait des loix pour l'empêcher; mais comme le consentement de la Couronne étoit nécessaire pour la confirmation de ces loix, elles n'ont jamais pu être établies, le Roi les ayant toujours rejetées comme contraires aux intérêts de la Compagnie Angloise d'Afrique: aussi la défense d'importer ces malheureuses victimes de l'avarice Européenne a-t-elle été une des premières opérations du Congrès général; & l'on doit croire qu'il ne tardera pas à statuer sur le sort des negres actuellement existans dans l'étendue des *Treize Etats unis*; car, quoique plusieurs Propriétaires en Pensylvanie leur aient donné la liberté, il en existe encore d'esclaves même dans cette Colonie, & beaucoup dans les Colonies Méridionales.

L'autre classe d'*hommes non libres* ne gémit pas dans l'esclavage; mais elle est privée de la liberté, dans le sens politique de ce mot qui implique la part dans le Gouvernement, & le droit de voter aux élections des

Officiers publics. Cette seconde classe se subdivise en plusieurs especes, & comprend :

1°. *Les Enfants mineurs*, c'est-à-dire, qui n'ont pas vingt ans accomplis. Comme ils sont en général sans propriétés jusqu'à cet âge, & sous l'autorité immédiate de leurs parens, on suppose que ceux-ci auroient trop d'influence sur leurs suffrages.

2°. *Les Apprentifs*; attachés à un maître pour apprendre de lui le commerce ou une profession quelconque, on présume qu'il auroit sur leurs voix, pendant la durée de leur apprentissage, une influence de même nature que celle des peres sur leurs enfans.

3°. Enfin, les *Domestiques engagés*. Ce sont en général des arrivans d'Angleterre, d'Irlande, d'Allemagne, &c. Beaucoup de ces émigrans n'ayant pas de quoi payer leur passage, conviennent avec les Capitaines qui consentent à les passer, de les servir eux & les personnes auxquelles ils céderont leur droit, pendant une, deux, trois ou quatre années, plus ou moins, pour leur tenir lieu d'argent; la durée de l'engagement se regle sur l'âge & les talens du domestique: des ouvriers déjà formés n'en contractent ordinairement que de fort courts.

Les Capitaines, en arrivant à l'Amérique, cèdent ces engagements de service aux habitans qui ont besoin de domestiques; mais il faut que la cession se fasse devant un Magistrat qui regle l'engagement conformément à la raison & à la justice, & qui oblige les Maîtres de promettre par un acte écrit, que, pendant la durée de l'engagement le domestique sera bien & dument nourri, vêtu, logé, &c.: qu'on lui apprendra à lire, à écrire & à compter; qu'on lui montrera quelque métier, ou qu'on l'instruira dans une profession qui puisse lui procurer par la suite de quoi vivre, & qu'à la fin du terme il sera mis en liberté, & recevra en quittant son maître un habillement complet & des hardes neuves. On délivre au domestique une copie de cet engagement, & il en reste une autre sur les Registres entre les mains du Magistrat, à qui le Domestique peut dans tous les tems avoir recours, si son maître le maltraite ou n'exécute pas fidèlement sa partie du contrat.

Cette heureuse coutume facilite aux Colonies l'acquisition de nouveaux habitans, & fournit aux pauvres de l'Europe le moyen de se transporter dans un pays où on les forme à une industrie qui leur assure pour la suite une honnête subsistance.

When this text is compared with the well-known "Information to those who would remove to America," written by Dr. Franklin in September 1782 (Smyth, VIII, 603), the points of similarity are such that the authorship of the *Note d'un Américain* can make but little doubt.

With the translation of the "Constitution de la Virginie," we now come to a new set of problems. A letter of La Rochefoucauld

d'Enville, dated from Paris, March 26, 1777, as the duke was about to leave for Rouen, contains the following passage :

. . . Voici une Gazette américaine que M. Dean m'a donnée parce qu'elle contient la Constitution du Maryland; mais il n'y a que le commencement, et, comme vous devez à ce qu'il m'a dit avoir la suite vous me feriez plaisir de me l'envoyer, parce que pendant mon séjour à Rouen je traduirai cette pièce et la constitution de Virginie. A mon retour, je vous rendrai tous vos livres; mais en attendant, je vous prie de me renvoyer avec ma traduction les deux *Remembrancers* qui y étoient joints, et dont j'aurai encore besoin.

An undated letter, certainly written at a later date, begs "Monsieur le Docteur Franklin" to return "the translation of the Constitution of Virginia if he has read it," and also to return at the same time "the two *Remembrancers* in which the constitution of Virginia is published" (de lui renvoyer aussi les deux *Remembrancers* qui contiennent celle de la Virginie).

In this instance we not only know that Franklin procured the text of the constitution of Virginia and that he read La Rochefoucauld's translation, but also what version of the text he communicated to La Rochefoucauld. We shall have occasion to refer later to this remark. The mention of the *Remembrancer*, however, opens new avenues to the hunter. It was a publication appearing somewhat irregularly and entitled *The Remembrancer, or, Impartial Repository of Public Events*, with the object "To select from all Public Prints, the best account of every material Public Event; to print it Octavo etc." Printed in London "for J. Almon," the journal had appeared for the first time in June 1775. The editor whose name is printed on the title page had already published in his *Parliamentary Register* several speeches of Governor Pownall and particularly his "Essay against the Bill suspending the Legislature of New York."<sup>1</sup> Soon the *Remembrancer* made it a point to publish documents dealing with the Insurgents and, in the Fall of 1776, had given what may be the first text of the Declaration of Independence ever published in England, with curious emendations, eliminating only the direct mentions of the King and of the Governors, but otherwise preserving the fervid denunciations of their policy, as will appear from the

<sup>1</sup> On Almon and Governor Pownall, see John Nicols, *Literary Anecdotes of the Eighteenth Century*. Vol. III, p. 61-67. London, 1814.

facsimile published here (*Remembrancer*, Part II, for 1776).<sup>1</sup> A few months later Almon, under pretense of publishing what he called "Strictures upon the declaration of the Congress at Philadelphia; in a letter to a noble Lord," gave *in toto* the text of the Declaration (*Remembrancer*, Part III, for the year 1776. London, 1777). The Declaration of Rights of Virginia had already appeared in Volume III, p. 221, for 1776. Whether or not any secret connection existed between the "Banquier de Londres" of the *Affaires de l'Angleterre et de l'Amérique* and John Almon or even Governor Pownall, the fact remains that the *Remembrancer* had soon become the chief source of information for the French publication and that both Franklin and Deane were acquainted with the English periodical.

We must now return to the French journal. Bound in Volume IX of the set in the possession of the New York Public Library appears the following notice:

L'éditeur du présent Recueil compte former un Cahier séparé des Constitutions des treize Etats unis de l'Amérique, ainsi que de l'Acte de confédération, refait en 1777; en tête duquel se trouvera l'Acte d'Indépendance. Ce cahier qui portera le titre de *Code Américain*, sera donné *gratis* à toutes les personnes inscrites pour la souscription des *Affaires de l'Angleterre et de l'Amérique*.

In a later notice the editor reminded the subscribers that he had not forgotten his promise, but, as "he has received only eight constitutions out of thirteen, he is waiting to make his collection complete" (April or May 1778). Finally, when in 1779, the *Affaires de l'Angleterre et de l'Amérique* stopped publication, for their aim had been achieved, the editor renewed his pledge to publish the *Code* as soon as "he receives the Constitution of Massachusetts."

In the meantime, he had been forestalled by the mysterious and enterprising Regnier. Professing to collect "*Les Loix constitutives des Etats-Unis d'Amérique*, only fragmentarily published in several foreign papers" (*publiées par lambeaux dans divers Journaux étrangers*), Regnier took from the *Affaires de l'Angleterre et de l'Amérique* the texts of the constitutions of Pennsylvania, New Jersey, Delaware, Maryland, Virginia, and South Carolina, and reproduced them verbatim in his *Recueil*, adding for good measure the Act of Confederation, the Declaration of Independence, the Rules of Navigation, the oath taken by the delegates to

<sup>1</sup> See p. 95.

politics, the curse of Scotland, the disgrace of his master, the despair of the nation, and the disdain of history.

*In Congress, July 4, 1776.*

*A Declaration by the Representatives of the United States of America, in General Congress assembled.*

When in the course of human events it becomes necessary for one people to dissolve the political bands which have connected them with another, and to assume among the powers of the earth the separate and equal station to which the laws of Nature and of Nature's God entitle them, a decent respect to the opinions of mankind requires that they should declare the causes which impel them to the separation.

We hold these truths to be self-evident; that all men are created equal; that they are endowed by their Creator with certain unalienable rights; that among these are life, liberty, and the pursuit of happiness. That to secure these rights, governments are instituted amongst men, deriving their just powers from the consent of the governed; and whenever any form of government becomes destructive of these ends, it is the right of the people to alter or to abolish it, and to institute new government, laying its foundation on such principles, and organizing its powers in such form, as to them shall seem most likely to effect their safety and happiness. Prudence indeed will dictate, that governments long established should not be changed for light and transient causes; and accordingly all experience hath shewn, that mankind are more disposed to suffer, while evils are sufferable, than to right themselves by abolishing the forms to which they are accustomed. But when a long train of abuses and usurpations, pursuing invariably the same object, evinces a design to reduce them

under absolute despotism, it is their right, it is their duty to throw off such government, and to provide new guards for their future security. Such has been the patient sufferings of these colonies, and such is now the necessity which constrains them to alter their former systems of government. The history of

is a history of repeated injuries and usurpations; all having in direct object the establishment of an absolute over these states. To prove this, let facts be submitted to a candid world.

He has refused his assent to laws, the most wholesome and necessary for the public good.

He has forbidden to pass laws of immediate and pressing importance, unless suspended in their operation till his assent should be obtained; and when so suspended, he has utterly neglected to attend them.

He has refused to pass other laws for accommodation of large districts of people, unless those people would relinquish the rights of representation in the legislature; a right inestimable to them, and formidable to only.

He has called together legislative bodies at places unusual, uncomfortable, and distant from the depository of their public records, for the purpose of fatiguing them into compliance with his measures.

He has dissolved Representatives Houses repeatedly, for opposing, with manly firmness, his invasions on the rights of the people.

He has refused for a long time, after such dissolutions, to cause others to be erected; whereby the legislative powers, incapable of annihilation, have returned to the people at large for their exercise: the state remaining in the mean time exposed to all the dangers of invasion from without, and convulsions within.

He

the Assembly of Massachusetts, and the "Instructions given by the city of Boston to the General Congress."

He then wrote to Dr. Franklin a letter, reproduced with very few changes at the head of the volume, placing the publication under his auspices. Neither Franklin nor La Rochefoucauld d'Enville could easily protest since the *Affaires de l'Angleterre et de l'Amérique* were published anonymously, semi-clandestinely, and supposedly in Antwerp. Livingston remarks, however, that the publisher inserted in Volume XI, p. xlj, of his periodical a note and a protest calling attention to the unauthorized collection which he characterized as "une piraterie aussi injuste envers le Public que mal-honnête à notre égard."

The identity of Regnier remains a mystery. I thought for a time that he might have been the provincial lawyer who later became duc de Massa and "Grand juge" under Napoleon. The signatures I have been able to compare are not unlike, but this hypothesis can scarcely be maintained since in the Franklin Papers is to be found another letter, dated June 5, 1780, signed by the same Regnier, and indicating that the compiler of the *Recueil* was about to sail for America in order to join Rochambeau's army. After his signature Regnier wrote his official title, "Directeur des hopitaux Militaires rue des Francs Bourgeois." We shall see shortly that he probably never sailed.

## II

### "CONSTITUTIONS DES TREIZE ETATS-UNIS DE L'AMÉRIQUE," 1783

This is the better known edition. The story of its publication has been related in detail by Luther S. Livingston (pp. 181-188). The subject is nevertheless far from being exhausted. The Franklin Papers contain more than a dozen letters written to Benjamin Franklin by the printer, Philippe-Denis Pierres, and several letters from La Rochefoucauld d'Enville indicating not only that the Duke had revised his earlier translations but that he added considerable material and made a few important changes in the arrangement. I shall simply note a few of the points which seem to have escaped Livingston's attention.

First of all the collection is not simply as it purports to be, a translation of the collection published in Philadelphia by order of Congress under the following title: *The Constitutions of the*

*Several Independent States of America; the Declaration of Independence; the Articles of Confederation between the said States; the Treaties between His Most Christian Majesty and the United States of America.* Published by order of Congress. Philadelphia, printed by Francis Bailey, in Market-Street, M DCC LXXXI.

It contains in addition the Treaty of Amity and Commerce between the State Generals of the United Low Countries and the United States, and the Treaty of Amity and Commerce between His Majesty the King of Sweden and the United States. These documents as the letters of La Rochefoucauld to Franklin conclusively show were procured by the Duke, by him translated and given to the printer. La Rochefoucauld had even thought of printing at the beginning of the volume an introduction by Dr. Franklin which the doctor probably refused to write. But if further evidence were needed of the active interest taken by Franklin in the publication of the official translation, it could be found in a manuscript note written by him on the title page of a copy sold in New York in 1935. It reads as follows: "Translated by Duke de Rochefoucauld and the Translation reviewed before Impression by B. F." (*American Book Prices Current*, 1934-35). We shall have occasion to recall this inscription later on.

One of the most notable changes consists in a complete redistribution of the notes, most of them, including the *Note d'un Américain*, transferred to the constitution of Massachusetts. At the beginning of the volume and giving authority to the publication is printed the translation of the Resolution of Congress of which we give here the original:

IN CONGRESS, December 29, 1780.

RESOLVED, That a Committee of three be appointed to collect and cause to be published, two hundred correct copies of the Declaration of Independence, the Articles of Confederation and Perpetual Union, the Alliances between these United States and his Most Christian Majesty, with the Constitutions or Forms of Government of the several States, to be bound together in boards. The members chosen, Mr. Bee, Mr Witherspoon, and Mr Wolcott.

Extract from the Minutes,

CHARLES THOMSON, *Secretary*.

It may also be remarked that in writing to Robert R. Livingston, on July 25, 1783, Franklin simply indicated that, "I prevailed with a friend, the Duc de Rochefoucauld, to translate our Book of

Constitutions into French, and presented copies to all the foreign Ministers." In his letter to Vergennes, written on March 24 of the same year, he had on the contrary admitted that "several of these constitutions have already appeared in the English and American newspapers; others have appeared elsewhere, but there has never yet been a complete translation of them." Thus the diplomatic expression "elsewhere" is made to cover both the *Affaires de l'Angleterre et de l'Amérique* and Regnier's publication. We may add that in promising that the publication would contain only the official texts "and no foreign matter," Franklin intentionally or unintentionally was overlooking the rather important notes added by La Rochefoucauld to the official texts and more particularly the *Note d'un Américain*. That his omission of any mention of Regnier's name was deliberate cannot be doubted. If the compiler of the collection published in 1778 had ever sailed for America, his stay in the United States had been of short duration, since on October 12, 1782 he wrote to Benjamin Franklin a letter both significant and somewhat impudent. From it, it appears that both Franklin and Jay had communicated to him quite a few official papers since Regnier speaks of "les pièces que votre Excellence ainsi que M. Jay ont bien voulu me communiquer." It seems also that Regnier had remained unaware that he had pirated the translation of La Rochefoucauld since he had presented a copy of his compilation to "this noble person." Finally he almost accused the Duke of treating him unfairly since he had heard that La Rochefoucauld was about to publish a translation of the "Recueil imprimé par ordre du Congrès," thus preventing Regnier from printing a second volume as a complement to "his" first. Obviously the collaboration of La Rochefoucauld with the *Affaires de l'Angleterre* had remained a well guarded secret.

### III

#### THE VIRGINIA DECLARATION OF RIGHTS

In order to make a complete study of the subject, it would be necessary to compare the text of 1783, and the text of 1778 with the original English publications of the constitutions. This comparison undertaken only for the constitution of Virginia has resulted in a puzzling combination of historical and bibliographical problems which I have not been able to solve to my own satisfaction.



The constitution of Virginia published in Volume V, No. XXII of the *Affaires de l'Angleterre et de l'Amérique* begins with a "Déclaration expositive des droits qui doivent nous appartenir, à nous & à notre postérité, & qui doivent être regardés comme le fondement & la base du Gouvernement." The same heading appears in the *Recueil* of 1778; it reappears with the omission of the word "expositive" in the edition of 1783.

In all three cases, the "Declaration" is dated "A Williamsburgh, premier Juin 1776"; and in all three cases the "Déclaration" lists eighteen articles.

On the other hand the official text reads: "A Declaration of Rights made by the representatives of the good people of Virginia, assembled in full and free Convention; which rights do pertain to them, and their posterity, as the basis and foundation of government."

No mistranslation can explain satisfactorily the rendering of *to them, and their posterity* by *à nous & à notre postérité*. Furthermore it is well known that the Declaration was passed by the Convention on June 12 and not on June 1; and finally there are only sixteen articles and not eighteen in the official text. Obviously the translator must have made use of a different text. On the other hand, Sabin lists under No. 100021 the following item: "*A Declaration of Rights made by the representatives of the good people of Virginia, assembled in full and free Convention; which rights do pertain to us, and our posterity, as the basis and foundation of government.*" [Williamsburg, 1776.] Small folio, pp. 2.

After a long search a copy of this document has finally been located in the collections of the Virginia Historical Society, through the relentless efforts of Miss Ellen Wooldridge and Mr. Clayton Torrence, Librarian of the Society, to whom I am greatly indebted for a photostatic reproduction and for valuable information concerning a text apparently overlooked by the biographers of George Mason, and most historians of the first constitution of Virginia. Another copy in the Madison Papers, annotated by Madison, has been published by Gaillard Hunt (*The Writings of James Madison*, Vol. I, p. 35). It had previously been reprinted by William G. Rives, in his *History of the Life and Times of James Madison* (Vol. I, Appendix B, p. 645). As it appears from the Journal of the Convention, this is simply the first proposed form of the Declaration, reported and read to the Convention on May 27, 1776,

and ordered to be considered by the Convention sitting as a Committee of the whole. It includes eighteen numbered articles and the heading corresponds exactly to the French translation. In the course of the discussion changes in the text and reduction from eighteen to sixteen articles took place as well as the change from "to us and our posterity" to "to them and their posterity." The final text, as adopted by the Convention on June 12, 1776, was printed in the *Virginia Gazette* (Dixon and Hunter) for June 15, 1776.

By a strange stroke of fortune it was the draft and not the final text which reached London during the Summer of 1776 and was printed by John Almon in his *Remembrancer*. Although the draft was also published in the *Virginia Gazette*, printed by Dixon and Hunter (No. 1295) on June 1, 1776, the heading is so different that it is certain that John Almon had in his hands the separate printing of the draft and not the *Gazette*. As this was the text used by La Rochefoucauld, as it appears from his letter to Franklin, it is here reproduced in full:

*Williamsburgh, in Virginia, June 1.*

*The following declaration was reported to the convention, by the committee appointed to prepare the same, and referred to the consideration of a committee of the whole convention; and in the mean time, it was ordered to be printed for the perusal of the members.*

A declaration of rights made by the representatives of the good people of Virginia assembled in full and free convention; which rights do pertain to us and our posterity, as the basis and foundation of government.

1. That all men are born equally free and independent, and have certain inherent natural rights, of which they cannot, by any compact, deprive or divest their posterity; among which are the enjoyment of life and liberty, with the means of acquiring and possessing property, and pursuing and obtaining happiness and safety.

2. That all power is vested in, and consequently derived from the people; that magistrates are their trustees and servants, and at all times amenable to them.

3. That government is, or ought to be, instituted for the common benefit, protection and security of the people, nation, or community. Of all the various modes and forms of government, that is best, which is capable of producing the greatest degree of happiness and safety, and is most effectually secured against the danger of mal-administration; and that, whenever any government shall be found inadequate or contrary to these purposes, the majority of the community hath an undubitable, un-

alienable, and indefeasible right to reform, alter or abolish it, in such a manner as shall be judged most conducive to the public weal.

4. That no man or sett of men, are intitled to exclusive or separate emoluments or privileges from the community, but in consideration of public services; which, not being descendible or hereditary, the idea of a man born a magistrate, a legislator or a judge, is unnatural and absurd.

5. That the legislative and the executive powers of the state should be separate and distinct from the judicative; and that the members of the two first may be restrained from oppression by feeling and participating the burthen of the people, they should at fixed periods, be reduced to a private station, return into that body from which they were originally taken, and the vacancies be supplied by frequent, certain and regular election.

6. That the elections of members to serve as representatives of the people in Assembly, ought to be free; and that all men having sufficient evidence of permanent common interest with, and attachment to the community have the right of suffrage.

7. That no part of a mans property can be taken from him, or applied to public uses, without his own consent, or that of his legal representatives; nor are the people bound by any laws but such as they have in like manner assented to for their common good.

8. That all power of suspending laws, or the execution of laws, by any authority without consent of the representatives of the people, is injurious to their rights, and ought not to be exercised.

9. That laws having retrospect to crimes, and punishing offences committed before the existence of such laws, are generally oppressive, and ought to be avoided.

10. That in all capital or criminal prosecutions a man hath a right to demand the cause and nature of his accusations, to be confronted with the accusers or witnesses, to call for evidence in his favour, and a speedy trial by an impartial judge of his vicinage, without whose unanimous consent he cannot be found guilty, nor can he be compelled to give evidence against himself; that no man be deprived of his liberty except by the law of the land, or the judgment of his peers.

11. That excessive bail ought not to be required, nor excessive fines imposed, nor cruel and unusual punishments inflicted.

12. That warrants unsupported by evidence, whereby any officer or messenger may be commanded or required to search suspected places, or to seize any person or persons, his or their property, not particularly described, are grievous and oppressive, and ought not to be granted.

13. That in controversies respecting property, and in suits between man and man, the ancient trial by jury is preferable to any other, and ought to be held sacred.

14. That the freedom of the press is one of the great bulwarks of liberty, and can never be restrained but by despotic governments.

15. That a well regulated militia, composed of the body of the people, trained to arms, is the proper, natural, and safe defence of a free state; that standing armies in time of peace should be avoided, as dangerous to liberty; and that in all cases the military should be under strict subordination to, and governed by the civil power.

16. That the people have a right to uniform government; and therefore that no government separate from or independent of the government of Virginia, ought of right to be erected or established within the limits thereof.

17. That no free government, or the blessing of liberty, can be preserved to any people but by a firm adherence to justice, moderation, temperance, frugality and virtue, and by frequent recurrence to fundamental principles.

18. That religion, or the duty which we owe to our Creator, and the manner of discharging it, can be directed only by reason and conviction, not by force or violence; and therefore, that all men should enjoy the fullest toleration in the exercise of religion, according to the dictates of conscience, unpunished and unrestrained by the magistrate, unless, under colour of religion, any man disturb the peace, the happiness or safety of society. And that it is the mutual duty of all to practice christian forbearance, love and charity, towards each other.

The printing of this version in the *Affaires de l'Angleterre et de l'Amérique* marked only the beginning of the strange fortune of the draft. It was naturally reprinted by Regnier in the *Recueil* of 1778; the fact that it was also reproduced without any change in the semi-official collection published under Franklin's supervision is more difficult to explain, unless we admit that the official text had never reached the man who was generally regarded as the author of the Pennsylvania Declaration. If we now refer to the texts published in Philadelphia by order of Congress and under the supervision of Bee, Witherspoon and Wolcott we shall look in vain for any Virginia Declaration. The chapter on Virginia begins with "The Constitution or Form of Government, agreed to and resolved upon by the Delegates and Representatives of the several Counties and Corporations of Virginia etc." Nor was this the only instance of this strange omission. The Virginia Declaration of Rights does not appear under any form whatsoever in any of the collected editions of the State Constitutions, printed either in America or in England previous to 1811, I have been able to con-

sult. It is not in the Glasgow edition of 1783; it is not in the Philadelphia edition of 1791; it is not in the Boston edition of 1797; it is not in *The American's Guide, the Constitutions of the United States of America*, printed in Philadelphia in 1810, although the book contains such extraneous material as the inaugural speeches of John Adams, Jefferson, and Madison. On the other had it appears featured as something rather unusual on the title page of *The Constitutions of the United States . . . to which are prefixed the Declaration of Independence, the Federal Constitution and the BILL OF RIGHTS OF THE STATE OF VIRGINIA*, Winchester, Virginia, from the Press of Jonathan Fister, 1811.

I confess not to have any satisfactory explanation to offer for this strange and persistent omission. The fact that the Declaration of Rights is prefixed to the constitution and consequently not an essential part of it can scarcely account for it, since such was the case of several other Bills of Rights, notably that of Maryland.

In the meantime, and in the absence of the official sixteen-article text, the eighteen-article draft was considered as authoritative not only in France but in America. I shall mention only two instances of the use made of it by the legislators of Massachusetts.

Article VI of the Massachusetts Declaration reads as follows:

No man, or corporation, or association of men, have any other title to obtain advantages, or particular and exclusive privileges, distinct from those of the community, than what arises from the consideration of services, rendered to the public. And this title being, in nature, neither hereditary, nor transmissible to children, or descendants, or relations by blood,—the idea of a man, born a magistrate, law-giver, or judge is absurd and unnatural.

The resemblance with Article IV of the Virginia Declaration is obvious:

That no man or set of men, are entitled to exclusive or separate emoluments or privileges from the community, but in consideration of public services; which not being descendible, neither ought the offices of magistrate, legislator or judge to be hereditary.

But there it ends, while the draft reads: "which not being descendible or hereditary, the idea of a man born a magistrate, a legislator or a judge, is unnatural and absurd." The only change made by the Massachusetts legislators was to change the order of the two words "unnatural" and "absurd."

Nor is this all. Article XXIV of the Massachusetts Declaration reads:

Laws, made to punish for actions, done before the existence of such laws, and which have not been declared crimes by preceding laws, are unjust, oppressive, and inconsistent with the fundamental principles of a free government.

Nothing of the sort appears in the final Declaration of Virginia, but the resemblance with Article IX of the draft is plain:

That laws having retrospect to crimes, and punishing offences, committed before the existence of such laws, are generally oppressive, and ought to be avoided.

Thus because of the obscurity in which the draft of June 1 has been buried, Massachusetts may have received credit for an article which was originally part of the Virginia Declaration, and for a strong expression of opinion on hereditary offices while due credit should have been given to the Virginia legislators. The same remark would probably apply to other State Declarations; I shall add only one more illustration.

When Georg Jellinek established his almost classic comparison between the French *Déclaration des droits de l'homme* and the American Bills of Rights he naturally quoted from the official version of the Virginia Declaration, with the result that in several instances he had to resort to various declarations, when a study of the draft or the French translation would have made patent the indebtedness of the French to the Virginians. For instance, Article VIII of the French *Déclaration* reads as follows: *La loi ne doit établir que des peines strictement nécessaires et nul ne peut être puni qu'en vertu d'une loi établie et promulguée antérieurement au délit et légalement appliquée.* Jellinek there quoted "New Hampshire XVIII and Maryland XIV and XV," when he should have compared Article IX of the draft which was not retained in the Declaration as passed by the Assembly: "That laws having retrospect to crimes, and punishing offences, committed before the existence of such laws, are generally oppressive, and ought to be avoided."

The same remark applies to Article X of the French *Déclaration*: "*Nul ne doit être inquiété pour ses opinions, même religieuses, pourvu que leur manifestation ne trouble pas l'ordre public établi par la loi.*" Jellinek compared "New Hampshire V,"

which ends with this restriction: "provided he doth not disturb the public peace, or disturb others, in their religious worship." If he had referred to the draft he would have found: "... unless, under colour of religion, any man disturb the peace, the happiness or the safety of society," which disappeared in the final version of the Virginia Declaration. Incidentally, these two illustrations might be interpreted as indicating that Maryland and New Hampshire as well as the French Assemblée Nationale derived these articles from the draft and not from the official text.

In the meantime the translation of the draft has been constantly reprinted in France. It was the text reproduced by Mazzei in his *Recherches sur les Etats-Unis*, published on Jefferson's request, in 1788, and apparently Jefferson never noticed that this version contained two articles not appearing in the Declaration as passed by the Assembly. In fact, he had completely overlooked the existence of the Declaration himself in his *Notes on the State of Virginia*. It was the text reprinted by Dèmeunier in the *Encyclopédie Méthodique* in the article on Virginia, which was again discussed in detail by Jefferson. It was the text reprinted in all the French collections dealing with the American constitutions of government. It was the text consulted by Emile Boutmy in his controversy with Jellinek ("La Déclaration des Droits de l'Homme et du Citoyen." *Annales des Sciences Politiques*, p. 415, 1902), which led to the strange consequence that the German jurist quoted from the sixteen-article Declaration and the French sociologist from the eighteen-article draft. No wonder they could not agree! This was also the text reprinted by Hachette and Co., in a popular undated edition of the *Déclaration des droits de l'homme et du citoyen*. It was finally the text given in an appendix by V. Marcaggi in his study on *Les Origines de la Déclaration des Droits de l'Homme de 1789*, Paris, 1912. As far as I know, it is the only version ever printed in France.

On the whole their happy ignorance of the final and official text of the Virginia Declaration served the French well since the *Déclaration* of 1789 was evidently the offshoot of the draft and not of the Declaration as passed on June 12, 1776 by the Virginia Assembly.

Thus circuitous paths and devious ways have led us back to our starting point. It would remain to publish and exploit more fully the material discovered in this exploration. As far as this

investigation is concerned, although we are unable to draw definite conclusions, we may perhaps express some hopes and wishes. It would certainly be desirable to study more thoroughly Franklin's connection with *Les Affaires de l'Angleterre et de l'Amérique* on the one hand and John Almon's *Remembrancer* on the other. No less interesting would be the publication in full of all the letters in the Franklin papers concerning the translation and the publication in France of the "American forms of government"; this would facilitate the study of the French *Déclarations* of 1789 and 1793, and permit to establish definitely the amount of the indebtedness of the French to the Virginians. Similarly it would be interesting and important to publish a truly critical edition of the Virginia Declaration of Rights, and to compare the different versions, including the draft printed by order of the Committee on June 1, 1776, with the Bills of Rights adopted by the several States of the Union. In any case it seems certain that no study of the influence and diffusion of the Virginia Declaration should be undertaken without due consideration of the forgotten document printed in France with the approval and under the auspices of Dr. Franklin.

*Gilbert Chinard*



## ACCESSIONS <sup>1</sup>

### AMERICAN PHILOSOPHICAL SOCIETY ARCHIVES

Material transferred recently from a former Treasurer's office.

Treasurer's Records—Miscellaneous cash books, ledgers, etc., 1819–1920.

Membership and attendance lists, 1792–1920.

Publication Records—Mailing and subscription lists for the Society's publications, 1817–1916; Committee minute book, 1826–1915; accounts, 1826–1924.

Library Records—Portions of two manuscript catalogues, ca. 1797–1798 (with these were several loose items, including records of books bought at the Dufief sale of Franklin's library in 1803, report of a Committee appointed to prepare a catalogue, 1797, and Nicholas Collin's report upon the manuscript catalogue of 1799); loan book, 1803–1835; binding records, 1803–1823, 1842–1846; library memoranda, 1873–1888; and rough minutes of the Library Committee, 1887–1897.

Miscellaneous—Journal of the proceedings of the corresponding secretaries, 1789–1822; letter book, 1837–1843; committees, 1804–1869, 1908–1915.

#### New acquisitions.

Certificates of membership issued to Joseph Priestley (1785), Nicholas Biddle (1813), and Henry Jonathan Williams (1833). The Priestley certificate, presented by Mr. P. H. Waddell Smith, of Princeton, is of particular interest in that it is earlier than any other in the Society's archives and is of different format.

Dunglison, Robley. Letter to Henry J. Williams; Hall of the American Philosophical Society, Oct. 13, 1848. A.L.S. 1 p. Concerns a dispute between the Society and W. D. Lewis.

Williams, Jonathan. Experiments and conjectures on magnetism & electricity; Mount Pleasant, June 11, 1798. A.D.S. 17 p. Read before the Society, June 15, 1798, but never printed.

#### <sup>1</sup> Key to abbreviations—

A.D.	autograph document	L.S.	letter signed
A.D.S.	autograph document signed	add.	address
D.S.	document signed	end.	endorsement
A.L.	autograph letter	p.	page
A.L.S.	autograph letter signed	v.	volume
A.L. in 3d P.	autograph letter in 3d person		

Lithograph of Independence Hall in 1876 by Theodore Poleni, which shows the Hall of the Society prior to the erection of the third story.

See also Hazard Collection, p. 110.

## FRANKLINIANA

Franklin, Benjamin. Address to [the American Philosophical Society; Sept. 27, 1785]. Print of A.D. 1 p. and end. Franklin's reply to greetings extended to him by the Society upon his return to America.

From original in possession of Mrs. Edward W. Smith.

— Letter to B. F. Bache; Passy, May 2, 1783. Print of A.L.S. 2 p. and end. Personal letter to grandson. From original in possession of Mrs. Edward W. Smith.

— Letter to Mathew Carey; Feb. 9, 1789. A.L. 1 p. and add. Encloses Remark on the Albany Plan. 1 p.

— Letter to M. de Chaumont; December 4 [1778]. A.L.S. 1 p. and add. In French. Transcribes news from America relative to the movement of the British fleet.

— Letter to M. Le Ray de Chaumont; Passy, August 5, 1779. L.S. 1 p. Pertains to orders for Capt. [John Paul] Jones.

— Letter to M. de Chaumont; Philadelphia, Oct. 20, 1785. A.L. 2 p. (Printed: Smyth, v. 9, 469.)

— Letter to M. de Chaumont; Philadelphia, Oct. 7, 1786. A.L.S. 2 p. (Printed: Smyth, v. 9, 542.)

— Letter to David Hartley; Passy, March 31, 1784. A.L.S.: B. Franklin [and] John Jay. 1 p. and end. Pertains to ratification of definitive treaty.

— Letter to Henry Laurens; Passy, March 31, 1784. A.L.S. 1 p. and end. Pertains to ratification of definitive treaty.

— Letter to James Lovell; Passy, July 22, 1778. L.S. 7 p. and end. (Printed: Smyth, v. 7, 174.)

— Letter to the Council of Massachusetts Bay; Passy, Sept. 9, 1788. L.S.: B. Franklin [and] John Adams. 1 p. Pertains to Hutchinson letters.

— Letter to Smith, Wright & Gray; Feb. 13, 1769. A.L.S. 1 p. and add. Instructions regarding finances.

— Letter to Charles Thomson; Philadelphia, Sept. 26, 1785. Print of A.L.S. 1 p. Acknowledges congratulations on his return home. From original in possession of Mrs. Edward W. Smith.

— Letter to Comte de Vergennes; Passy, March 27, 1779. L.S. 2 p. In French. Pertains to prizes.

— Letter to Jonathan Williams; New York, March 29, 1776. A.L.S. 1 p. and add. Personal letter.

— Letter to [Jonathan Williams; April 18, 1778?]. A.L.S. 3 p. and end. Personal letter.

- [Memorandum regarding the delivery of mail] Philadelphia, April [ca. 1755]. A.D. 2 p.
- Philadelphia Contributionship for the Insurance of Houses from Loss by Fire. [Order to pay Franklin and Hall £6 for printing 500 policies and other items] Philadelphia, March 25, 1765. D.S. 1 p. Receipted by Franklin and Hall, March 29, 1765. Philadelphia. Post Office. Records of letters sent from the Post Office at Philadelphia, Oct. 18, 1764–Sept. 22, 1767. 64 leaves in ms.
- Records of letters received into the Post Office at Philadelphia, May 12, 1767–April 21, 1768. 22 leaves in ms.
- Franklin Imprints.
- Proclamation [against selling liquor to Indians] 11th day of August . . . one thousand seven hundred and forty-nine. Philadelphia, Franklin [1749]. Broadside. Curtis: 429.
- Dell, William. The Doctrine of Baptisms . . . 5th ed. London printed; Philadelphia, reprinted, by B. Franklin, and D. Hall, 1759. Curtis: 634.
- Articles of the Friendship Fire-Company . . . thirtieth day of the fourth month (April) one thousand seven hundred and fifty-five. [Philadelphia, Franklin, 1761?] Broadside. Unrecorded. Presented by Dr. A. S. W. Rosenbach.
- FitzSimins, Thomas. Letter to Benj. Rush; New York, April 22, 1790. A.L.S. 3 p. and add. Death of Dr. Franklin.
- Hosack, David. Letter to Sir Joseph Banks; New York, Jan. 10, 1820. A.L.S. 2 p. and add. Gives additional light on the affair of the Hutchinson letters and Franklin's implication in it.
- McAllister, John A. Letter to B. J. Lossing; Philadelphia, June 26, 1864. A.L.S. 4 p. Pertains to a portrait of B. Franklin by Robert Fulton.
- Nini medal of Benjamin Franklin.
- See also the Hazard Collection, p. 110.
- Franklin, William. Letter to Aaron Burr; London, Oct 3 [1808]. A.L.S. 1 p. and add.
- Letter to John Hughes; Burlington, June 9, 1769. A.L.S. 1 p.
- Letter to [William] Trent; Perth Amboy, March 14, 1776. A.L.S. 3 p. and add.
- Franklin, William Temple. Letter to Jonathan Williams; London, April 25, 1772. A.L.S. 1 p. and add.

## JEFFERSONIANA

- Jefferson, Thomas. Case book . . . 1767–1774. Microfilm of A.D. in possession of Henry E. Huntington Library.
- Commonplace book. Photostat from A.D. in possession of Henry E. Huntington Library. Presented by Dr. Gilbert Chinard.

- Commonplace book. Photostat from A.D. in possession of the Library of Congress. Presented by Dr. Gilbert Chinard.
  - Indenture for a tract of land in Cumberland county, Virginia . . . Oct. 17, 1790. A.D.S. 3 p. with survey—1 p.
  - Letter to Benjamin Rush; Washington, Dec. 14, 1800. A.L.S. 1 p. and add.
- Collection of about 300 printed items consisting of presidential messages, controversial pamphlets, and eulogies.  
See also the Hazard Collection, p. 111.

## HISTORY OF AMERICAN SCIENCE AND CULTURE

- Barlow, Joel. Letter to Dr. [Benjamin] Rush; Kalorama, Jan. 11, 1810. A.L.S. 1 p. and add. Pertains to the publication of the work on the Lewis and Clark expedition.
  - Darwin, Charles. Letter to — —; Down, Beckenham, Kent, May 23, 1872. A.L.S. 4 p. Pertains to the study of cats. Presented by Dr. Edwin G. Conklin.
  - Gray, Asa. Letter to P[arker] Cleveland; Cambridge, Sept. 18, 1845. A.L.S. 1 p. and add. Botanical.
  - Letter to Wm. R. Prince; Cambridge, Oct. 8, 1862. A.L.S. 3 p. Botanical.
- Ebenezer Hazard Collection (33 items bound in 1 volume):
- American Academy of Arts and Sciences. Certificate of membership issued to Ebenezer Hazard; Jan. 31, 1781.
  - Letter to Ebenezer Hazard; Beverly, March 9, 1781. A.L.S.: Joseph Willard. 1 p. Notice of election to membership in the Academy.
  - American Journal, and General Advertiser. Feb. 28, 1781.
  - American Philosophical Society. Certificate of membership issued to Ebenezer Hazard; Jan. 20, 1786.
  - Letter to Ebenezer Hazard; Philadelphia, Jan. 27, 1781. A.L.S.: T. Matlack. 2 p. and add. Notice of election to membership in the Society.
  - Off-the-record minute of the meeting of January 19, 1781. Ebenezer Hazard was elected to membership at this meeting.
  - Bache, Richard. Commission appointing Ebenezer Hazard surveyor of the post roads, from Jan. 6, 1776 [i.e. 1777?] for three years; Philadelphia, Jan. 6, 1776 [i.e. 1777]. A.D.S. 1 p.
  - Bleeker, Anthony L. Military pass issued to Ebenezer Hazard; New York, June 24, 1776. A.D.S. 1 p. and end.
  - Clinton, George. Military pass issued to Ebenezer Hazard; King's Bridge, Aug. 30, 1776. A.D.S. 1 p. and end.
  - Franklin, Benjamin. Commission appointing Ebenezer Hazard deputy postmaster of New York, beginning Oct 1, 1775 for three years; Sept. 21, 1775. Printed D.S. 1 p.

- Letter to [Ebenezer] Hazard; Philadelphia, Aug. 3, 1775. A.L.S. 1 p. and add. Postal affairs.
- Letter to E[benezer] Hazard; Philadelphia, Sept. 25, 1775. A.L.S. 1 p. and add. Postal affairs.
- Hancock, John. Letter to Ebenezer Hazard; Philadelphia, July 9, 1776. A.L.S. 1 p. and add. Postal affairs.
- Military passes issued to Ebenezer Hazard; May 8, 1777 and Oct. 30, 1777. D's S. 1 p. each.
- Hazard, Ebenezer. [Covenant with the most high God] New York, Dec. 13, 1766, renewed March 1, 1767. A.D.S. 1 p. and end.
- Oath of allegiance to the United State; Lancaster county, June 22, 1778. A.D.S. 1 p. and end.
- Huntington, Samuel. Military pass issued to Ebenezer Hazard; Philadelphia, Dec. 9, 1780. A.D.S. 1 p. and end.
- Insurance Company of North America. Extracts from minutes of Dec. 17, 1799, and Jan. 13, 1800; certified May 14, 1814. A.D.S: R. S. Stephens. 1 p. and end. Pertains to Mr. Hazard's retirement as secretary.
- Jefferson, Thomas. Letter to Ebenezer Hazard; Virginia, April 30, 1775. A.L.S. 1 p. and add. Pertains to Mr. Hazard's proposal to publish a collection of American state papers.
- Livingston, Walter. Letter to Ebenezer Hazard; Board of Treasury, Jan. 17, 1786. A.(?)L.S. 1 p. and add. Postal affairs.
- McKesson, John. Military pass issued to Ebenezer Hazard; Fishkill, Dec. 16, 1776. Printed D.S. 1 p.
- Meigs, Return J. Letter to Ebenezer Hazard; Southwest Point, April 5, 1805. A.L.S. 3 p. Establishment of schools for the Cherokees.
- New York Historical Society. Letter to Ebenezer Hazard; New York, Oct. 24, 1810. A.L.S: Sam Miller. 1 p. and add. Notice of election to honorary membership in the Society.
- New York. Independent Company of Free Citizens. Notice of meeting to be held at two o'clock, Oct. 9, 1775. Printed D. S: Robt. Manley. 1 p.
- Philadelphia Dispensary. Receipt to Eben. Hazard for contribution for 1796. Printed D.S: John Clifford. 1 p.
- Presbyterian Church in the U. S. General Assembly. Extract from minutes of May 21, 1813. A.D.S: John E. Latta. 1 p. and end. Thanks to Mr. Hazard for making the index to V. 2 of the printed extracts.
- Resolution passed at meeting of May 18, 1804. D. 1p. Appoints Ashbel Green and Ebenezer Hazard to write the history of the church.
- Society for Promoting the Manumission of Slaves. Letter to Ebenezer Hazard; New York, July 6, 1787. A.L.S: J.

- Keefe (?). Notice of his election to membership in the Society.
- Sproat, James. Letter to Ebenezer Hazard; Philadelphia, May 22, 1792. L.S. 1 p. and add. Notice of his election to the Board of the Corporation for the relief of poor distressed Presbyterian ministers, their widows, etc.
- Washington, George. Letter to [Ebenezer] Hazard; May 2, 1776. A.L. in 3d P. 1 p. and add. Pertains to the army at Boston.
- Letter to Ebenezer Hazard; New Windsor, May 9, 1781. L.S. 1 p. and add. Postal affairs.
- Letter to Ebenezer Hazard; New York, July 3, 1789. L.S. 2 p. and end. Postal affairs.
- Linnean Society of Lancaster County. Ms. minute book, 1862–1896.
- Samuel George Morton Papers. A collection of 486 letters to Dr. Morton, covering the period 1819–1850. J. J. Audubon, John Bachman, Charles Caldwell, Richard Harlan, Samuel Hildreth, William Maclure, Thomas Nuttall, Charles Pickering, Benjamin Silliman, John Torrey, J. K. Townsend, and Gerard Troost are listed among the correspondents. These were presented by Mrs. John Story Jenks and Mr. Arthur V. Morton, grandchildren of Dr. Morton. To this collection have been added nine items deposited by the Academy of Natural Sciences of Philadelphia.
- Peale, Rembrandt. Letter to C. Edwards Lester; Philadelphia, Jan. 4, 1846. A.L.S. 2 p. and add. Promises to contribute biographical material for Lester's proposed work [*Artists of America*, 1846].
- Letter to [John] Durand; Philadelphia, Oct. 3, 1857. A.L.S. 1 p. and end. Sends an article on George Washington for the *Crayon*.
- Priestley, Joseph. Letter to Jonathan Williams; London, Aug. 23, 1793. A.L.S. 2 p. and add. Priestley's plans to emigrate to America.
- Rafinesque Papers. A collection of letters to and from Constantine Samuel Rafinesque, writings by him, and miscellaneous correspondence, consisting of 221 items and covering the period 1808–1840. Deposited by the Academy of Natural Sciences of Philadelphia.
- Rush, Benjamin. *Travels through life, or, An account of sundry incidents and events in the life of Benjamin Rush . . . written for the use of his children.* [1800] A.D. 8 pts. (Also copy made ca. 1814 with some deletions.)
- [Commonplace book] March 1792–February 1813. A.D.
- Rush, Richard. Letter to James Rush; Washington, May 23, 1814. A.L.S. 3 p. and end. Pertains to the proposed publication of their father's autobiography.

- Letter to [James Rush?]; May 1814. A.L.S. 2 p. Pertains to certain deletions thought advisable in the publication of their father's autobiography.
- Rush, Samuel. [Commonplace book] February 28–September 18, 1859. A.D. Contains biographical material about his father.
- Rush, William. Letter to James Rush; Oct. 1, 1848. A.L.S. 1 p. and add. Pertains to their father's autobiography.
- Elihu Thomson Papers. Additional material, numbering some 400 miscellaneous items, has been presented from the Elihu Thomson Estate. This consists chiefly of early letters from Dr. Thomson to his family, photographs, and the correspondence regarding posthumous honors to Dr. Thomson.<sup>1</sup>

Other acquisitions worthy of special mention, but which do not adapt themselves to the foregoing classifications include a collection of the writings of Julius Friedrich Sachse, a member of the Society from 1894 to 1919, presented by Miss Emma Sachse. From Dr. Walton Brooks McDaniel came seven classics of the fifteenth and sixteenth centuries, including a 1513 edition of Pliny's *Naturalis Historia*. Dr. Philip P. Calvert presented holograph letters from Thomas Moore, the Irish poet, to Mrs. Long, postmarked July 22, 1841, and from Thomas Carlyle to R. H. Horne, December 3, 1839. Two works important as foundation stones in the history of science were acquired by purchase—Isaac Newton's *Principia*, the first edition of 1687, and William Gilbert's *De Magnete*, the Stettin quarto of 1628.

<sup>1</sup> David O. Woodbury's biography of Elihu Thomson, entitled *The Beloved Scientist*, was published in January 1944.

#### 4. REPORT OF THE COMMITTEE ON PUBLICATIONS

The Committee on Publications for the year 1943-44 consists of the following members: Jacob R. Schramm, *Chairman*, Luther P. Eisenhart, William K. Gregory, Henry C. Lancaster, William E. Lingelbach, Forest R. Moulton, Arthur D. Nock, Ernest M. Patterson, Conyers Read, Adolph H. Schultz, Robert L. Schuyler, T. Leslie Shear, Harold C. Urey, and Edwin G. Conklin, *President*.

During the year 1943 five meetings of the Committee were held, namely on February 20, April 10, May 8, October 9, and December 11.

Considerable attention was given to informal discussions of the question of the distribution of the Society's publications. As stated in the 1941 YEAR BOOK, "Publications that fail to reach the reader are wasted." In considering the problem, it has been generally assumed that the Society's major concern is not in the financial return on its publications, but rather in "promoting useful knowledge" through their effective distribution. We do not, therefore, approach the problem from the point of view of the commercial publisher, and the Society has not in the past developed its publications and their distribution on the basis of a large subscription list.

In general, the larger part of the publications are distributed by way of exchange with other institutions, chiefly scientific and learned societies. From many of these there is no commensurate return, and from the nature of the case there cannot be. The remainder of the editions is sold, or is kept as stock on hand. The system is a very generous one, and the profit motive scarcely enters into the plan at all. Some would make it even more generous. On the other hand, there is a question as to whether the system, liberal as it is, really meets the objectives the Society has in mind. Doubts as to this subject have been growing, and Dr. Schramm, the Chairman of the Committee, has begun an intensive study of the problem. Factual data as to our own experience and the practice of other societies must obviously form the basis for an intelligent discussion of the many questions which a radical change from the present system, possibly to a subscription basis, would involve.



On the matter of Dr. Schramm's report on the complicated problems of printing the *Linguistic Atlas of the United States and Canada*, a letter from Dr. Waldo G. Leland, Director of the American Council of Learned Societies, expressed the Council's sincere appreciation of the exceedingly valuable study that was made by the Chairman of the Committee on Publications of the difficult problems of publication that arose in connection with the Council's *Linguistic Atlas*. He reported that the Executive Committee of the Council has voted to adopt the recommendations made by the Society's Committee, and believes that this will not only greatly reduce the cost of publication of the *Atlas* but will make it more useful.

On the points of the policy discussed in the Report of last year, efforts to impart, so far as is practical, a certain degree of unity and continuity of subject matter to the different numbers of the PROCEEDINGS have been reasonably successful, as is indicated by the titles of the five numbers published during the year. The tentative plans of establishing within the present MEMOIR series one or two supplementary series in particular fields in which the Society has special interest and competence has received continued attention. Certain of the manuscript collections in the Library, properly edited and published, are being considered as items in a series of volumes of *Americana*. Indeed, with the development of more constructive plans for the Society's Library and archives, there is here an enviable opportunity to integrate two of the important activities of the Society. The interest expressed in a series on the History of Science in America, a field in which the Library of the Society is also very active, presents similar possibilities. Its constructive development, however, must await the appointment of the special committee for the study of the problems, and a report for consideration by the Committee on Publications.

Finally, it cannot be too often repeated that a primary objective of the Committee's publication policy is to maintain the Society's publications on the highest possible level. Amid the serious interruption of the work of European societies and academies, the American Philosophical Society, as the oldest learned society of America, is not only under a heavy obligation in this regard, but has before it opportunities unparalleled in its history.

The war greatly increased the problems of the editorial office

during the year. While some authors entered the armed services of the nation, others were called upon for special service in scientific and other fields, or were confronted with extra duties because of the withdrawal of colleagues from academic and civil life. At the same time the personnel of printing establishments experienced an unprecedented labor turn-over. All too frequently skilled workers were replaced by inexperienced and untrained persons. Quota reductions on paper, both as to quantity and quality, coupled with priority claims of government departments and other bodies, caused considerable delay and uncertainty. On the other hand, the pressure for publication continued. The Committee on Publications has been very active during the year. Forty-five manuscripts were accepted for publication during the year, as follows:

In the PROCEEDINGS .....	42 papers
TRANSACTIONS .....	2 monographs
MEMOIRS .....	1 monograph

Twenty-three manuscripts were considered and declined.

During 1943 the following publications were issued:

PUBLICATIONS OF THE AMERICAN PHILOSOPHICAL SOCIETY  
DURING THE YEAR 1943

TRANSACTIONS:

Vol. XXXII, Pt. 3. April 1943.

Hellmut de Terra, H. L. Movius, Jr., E. H. Colbert, and J. Bequaert. Research on Early Man in Burma. 200 pp., 35 pls., 106 figs.

Vol. XXXIII, Pt. 2. November 1943.

William Bartram. Travels in Georgia and Florida, 1773-74; a report to Dr. John Fothergill. Annotated by Francis Harper. 122 pp., 27 pls.

PROCEEDINGS:

Vol. 86, No. 2. February 1943.

Symposium on Recent Advances in American Archaeology.

Sylvanus Griswold Morley. Archaeological Investigations of the Carnegie Institution of Washington in the Maya Area of Middle America, during the Past Twenty-eight Years. pp. 205-219. 1 map, 10 figs.

Henry B. Collins, Jr. Eskimo Archaeology and Its Bearing on the Problem of Man's Antiquity in America. pp. 220-235. 5 figs.

L. S. Cressman. Results of Recent Archaeological Research in

- the Northern Great Basin Region of South Central Oregon. pp. 236-246. 13 maps.
- Frank C. Hibben. Discoveries in Sandia Cave and Early Horizons in the Southwest. pp. 247-254. 13 figs.
- Edgar B. Howard. Folsom and Yuma Problems. pp. 255-259.
- Emil W. Haury. A Possible Cochise-Mogollon-Hohokam Sequence. pp. 260-263. 1 fig.
- Harold S. Colton. Reconstruction of Anasazi History. pp. 264-269. 1 map.
- John C. McGregor. Burial of an Early American Magician. pp. 270-298. 3 colored pls., 11 figs.
- Fay-Cooper Cole. Chronology in the Middle West. pp. 299-303. 1 fig.
- T. M. N. Lewis. Late Horizons in the Southeast. pp. 304-312. 8 figs.
- William A. Ritchie. Recent Advances in New York State and the Northeast. pp. 313-314.
- Dorothy Cross. The Effect of the Abbott Farm on Eastern Chronology. pp. 315-319.
- George C. Vaillant. The Aztecs: Their Cultural and Historical Position in Middle American Archaeology. pp. 320-322.
- Wendell C. Bennett. The Position of Chavin in Andean Sequences. pp. 323-327.
- Vol. 86, No. 3. July 1943.
- Cecilia Payne-Gaposchkin and Sergei Gaposchkin. Variable Stars and the Sources of Stellar Energy. pp. 329-338. 1 fig.
- Charlotte M. Sitterly and Arthur S. King. Thorium in the Sun. pp. 339-341.
- Zdeněk Kopal. An Application of the Method of Least Squares to the Adjustment of Photometric Elements of Eclipsing Binaries. pp. 342-350.
- Zdeněk Kopal. The Effects of Reflection upon Light and Velocity Curves of Close Binary Systems. pp. 351-363.
- K. Aa. Strand. The Orbital Motion of 61 Cygni. pp. 364-367. 3 figs.
- William Herbert Hobbs. The Glacial Anticyclone and the Continental Glaciers of North America. pp. 368-402. 35 figs., 12 maps.
- George Gaylord Simpson. Notes on the Mammal-Bearing Tertiary of South America. pp. 403-404.
- John H. Gerould. Genetic and Seasonal Variations of Orange Wing-Color in *Colias* Butterflies. pp. 405-438. 2 colored pls., 8 figs., 1 map.

Earl H. Myers. Life Activities of Foraminifera in Relation to Marine Ecology. pp. 439-458. 1 pl., 7 figs.

Roberts Rugh and Douglas A. Marsland. The Effect of Hydrostatic Pressure upon the Early Development of the Frog's Egg (*Rana pipiens*). I. Macroscopic Observations. pp. 459-466. 2 pls., 2 figs.

Phillip R. White and Armin C. Braun. A Cancerous Neoplasm of Plants Produced by Autonomous, Bacteria-Free Crown-Gall Tissue. pp. 467-469.

L. O. Kunkel. Potato Witches'-Broom Transmission by Dodder and Cure by Heat. pp. 470-475. 4 figs.

Vol. 87, No. 1. July 1943.

Symposium on the Early History of Science and Learning in America.

Gilbert Chinard. The American Philosophical Society and the World of Science. pp. 1-11.

Merle M. Odgers. Education and the American Philosophical Society. pp. 12-24.

Franklin Edgerton. Notes on Early American Work in Linguistics. pp. 25-34.

Richard H. Shryock. American Historiography: A Critical Analysis and a Program. pp. 35-46.

Julian P. Boyd. Horatio Gates Spafford, Precursor of Bessemer. pp. 47-50.

Frank A. Fetter. The Early History of Political Economy in the United States. pp. 51-60.

Alaš Hrdlička. Contribution to the History of Physical Anthropology in the United States of America. pp. 61-64.

Thomas Jefferson Wertenbaker. American Georgian Architecture. pp. 65-69. 22 figs.

William B. Dinsmoor. Early American Studies of Mediterranean Archaeology. pp. 70-104. 23 figs.

A. Hyatt Mayor. Early American Painters in England. pp. 105-109. 9 figs.

E. D. Merrill. Rafinesque's Publications from the Standpoint of World Botany. pp. 110-119.

Vol. 87, No. 2. August 1943.

Symposium on Post-War Problems.

Guy Stanton Ford. America Enters the Scene. pp. 121-125.

Frank G. Boudreau. Social and Economic Implications of Freedom from Want of Food. pp. 126-132.

John H. Williams. Problems of Post-War International Monetary Stabilization. pp. 133-138.

Alexander Loudon. Some Thoughts on Post-War Planning. pp. 139-146.

Robert B. Warren. Money and Sovereignty. pp. 147-151.

Halvdan Koht. The Small Nations in the Post-War World. pp. 152-160.

Frank Boas. Individual, Family, Population, and Race. pp. 161-164. (Not read in Symposium.)

Frank W. Notestein. Some Implications of Population Change for Post-War Europe. pp. 165-174. 4 figs.

Emory R. Johnson. Panama Canal Revenues and Finances. pp. 175-188. (Not read in Symposium.)

Alexander Loveday. The Economics of Transition. pp. 189-193.

Oskar Halecki. The Problem of Self-Determinism. pp. 194-198.

Vol. 87, No. 3. July 1943.

Bicentennial of Thomas Jefferson, April 22, 23.

Edwin G. Conklin. Introduction to the Jefferson Bicentennial Program. pp. 199-200. 1 pl.

Carl Becker. What Is Still Living in the Political Philosophy of Thomas Jefferson? pp. 201-210.

Roland S. Morris. Jefferson as a Lawyer. pp. 211-215.

M. L. Wilson. Thomas Jefferson—Farmer. pp. 216-222.

Louis B. Wright. Thomas Jefferson and the Classics. pp. 223-233.

Harlow Shapley. Notes on Thomas Jefferson as a Natural Philosopher. pp. 234-237.

Fiske Kimball. Jefferson and the Arts. pp. 238-245.

John Dickinson. The Old Political Philosophy and the New. pp. 246-262. (Read November 20, 1942.)

Gilbert Chinard. Jefferson and the American Philosophical Society. pp. 263-276. 1 pl.

Carl Van Doren. The Beginnings of the American Philosophical Society. pp. 277-289. 5 pls.

#### MEMOIRS:

Vol. XVIII. Stephen Winsor Reed. The Making of Modern New Guinea. xix, 326, 8 figs., 1 map.

Vol. XIX. Emile Cailliet. La Tradition Littéraire Des Idéologues. xix, 322, 1 pl.

Vol. XX. M. F. Ashley Montagu. Edward Tyson, M.D., F.R.S., 1650-1708; and the Rise of Human and Comparative Anatomy in England. xxix, 488, 1 pl., 56 figs.

YEAR BOOK for 1942, 398 pages.

The receipts from the sale of publications during 1943 amounted to \$5,533.35. The cost of direct advertising was \$537.11; this consisted of sending announcements of certain publications to libraries, institutions, and individuals. In addition to this, advertisements of certain of the Society's recent publications have been placed in a few historical journals. Copies of almost every publication issued by the Society during the year have been sent to appropriate journals for review.

### COST <sup>1</sup> OF PUBLICATIONS DURING 1943

#### TRANSACTIONS

Vol. XXXII, Part 3. 200 pp., 35 pls., 106 figs. (1,002 copies) .....	\$2,700.15
Vol. XXXIII, Part 2. 122 pp., 27 pls. (1,200 copies) .....	1,681.40

#### PROCEEDINGS

Vol. 86, No. 1. 204 pp. (2nd printing—300 additional copies) .....	310.25
Vol. 86, No. 2. 123 pp., 3 color pls. (1,232 copies) ..	1,668.46
(2nd printing—300 additional copies) .....	361.31
Vol. 86, No. 3. 150 pp., 5 pls. (1,196 copies) .....	1,580.83
Vol. 87, No. 1. 119 pp., 21 pls. (1,507 copies) .....	1,979.67
Vol. 87, No. 2. 78 pp. (1,537 copies) .....	631.23
Vol. 87, No. 3. 91 pp., 7 pls. (1,652 copies) .....	763.52

#### MEMOIRS

Vol. XVIII. 326 pp., 1 map, 4 pls. (750 copies) ....	1,451.33
Vol. XIX. • 322 pp., 1 pl. (512 copies) .....	1,625.00
Vol. XX. 488 pp., 1 pl., 56 figs. (733 copies) .....	2,942.11
YEAR BOOK for 1942, 398 pp. (1,032 copies) .....	1,806.63

<sup>1</sup> Includes all expenses connected with publications, viz., printing, engraving, wrapping, addressing, mailing, postage, etc., except that of reprints.

## 5. REPORT OF THE COMMITTEE ON RESEARCH

The Laws (Chap. V, Art. 4) specify that the Committee on Research shall consist of the President, *ex officio*, and not fewer than six other members, representative of the four Classes, who shall be nominated by the President and elected by the Council. In practice it has been found desirable to have more than six elected members in order to obtain wider representation of subjects. While regular election to the Committee is for a term of three years, several persons so elected have found it necessary to resign and others have been appointed to fill out their terms. There is no provision in the Laws against the reelection of a person to serve on this Committee. Several members of the Committee have served for two or more terms and their experience has been of great and increasing value. All serve without compensation, their only recompense being for actual expenses incurred in attending meetings, as in the case of all other committees.

The members of the Committee for 1942-43, the subjects they represent and the dates of their last election are listed herewith:

- Eisenhart, Luther P., *Chairman* (Mathematics), 1942.
- Albright, William F. (Archaeology), 1942.
- Bronk, Detlev W. (Biophysics and Physiology), 1942.
- Cheyney, Edward P. (History), 1942.
- Chinard, Gilbert (Languages and History), 1941.
- Du Bois, Eugene F. (Medicine), 1942.
- Fetter, Frank A. (Political Economy), 1942.
- †Keppel, Frederick P. (Education), 1942.
- Morris, Roland S. (Jurisprudence), 1942.
- Shapley, Harlow (Astronomy), 1942.
- Sinnott, Edmund W. (Botany), 1943.
- Swann, W. F. G. (Physics), 1942.
- Taylor, Hugh S. (Chemistry), 1942.
- Conklin, Edwin G., President, *ex officio* (Biology), 1942.

There are three research funds in the keeping of the Society, the Penrose Fund which is unrestricted, the Johnson Fund which is

† Deceased.

partially restricted in that it has been agreed that persons working in certain institutions may be regarded as occupying a preferred position, and the Daland Fund which is restricted to research in clinical medicine and one institution has, for the time being, been given a preferred position. The Committee has been charged with the distribution of research grants from all three of these funds and the same forms of application and methods of procedure are used in all cases.

At the June meeting of the Committee a gift of \$600 was reported from an anonymous contributor, for the purpose of carrying further Dr. Warren H. Lewis' work on protoplasmic and developmental movements as recorded in moving pictures. The gift was accepted with the understanding that a check for \$600 would be sent to the Wistar Institute of Anatomy and Biology for the continuation of Dr. Lewis' work.

The Committee held five meetings during the year 1943, namely, on February 18, April 23, June 4, October 8, and December 10. Applications and supporting letters are manifolded and sent to the members of the Committee about ten days in advance of the meeting; in many cases members consult by correspondence or in person with applicants, or with persons conversant with the applicants or their projects.

Several years ago the Committee decided that apparatus and materials of lasting value that have been purchased from our research funds should be marked with metal tags reading: "Property of the American Philosophical Society, Philadelphia," and should be subject to recall when the project for which they were purchased had been fulfilled. The Committee has been receiving applications for apparatus and materials similar to that already on loan. In order to meet such applications, the Committee has voted to request the return of such items after the expiration of the period named in the application as the probable duration of the research, unless there are good reasons why this should not be done. A list of items follows:

*Apparatus on loan*

Concave diffraction grating.

Equipment for aluminizing mirrors in optical train.

Regional spectrophotometer, direct vision hand spectroscope, thermostat for rapid reaction device.

High precision graduated circle with accompanying microscopes.



Geiger-Müller counter, electrometer, ionization chamber.  
Thermionic DC amplifier, galvanometer.  
Permanent magnet for construction of beta-ray spectrograph.  
10 milligrams radium-beryllium neutron source.  
Warburg respirometer.  
2 Densitometers.  
Dionic water tester.  
Libby photoreflexometer.  
Colorimeter.  
High angle centrifuge.  
Zeiss research microscope.  
Spencer research microscope.  
Photoelectric colorimeter.  
Victoreen condenser-type r-meter with a 25-r chamber, 100-4 chamber tube and chamber.  
Amplifiers and recording system for encephalography.  
2 Oscillographs.  
Equipment for measuring alpha particles, and photographic alpha particle recorder.  
Spencer stereoscopic microscope, micro-projector, Nicholas illuminator.  
Radio test-meter.

*Apparatus returned*

Thermograph, hygrograph.  
Taylor Instrument Company dermatherm.  
Micro-manipulator.

*Apparatus sold*

Rain gauges and hygrometer.  
Micro-manipulator.  
Spencer inclinocular research microscope, Spencer binocular dissecting microscope.

Although in the past, grants have been made from the Penrose Fund in aid of publications, it has been decided that applications for such grants shall be referred to the Committee on Publications, but only in cases when the application is in keeping with the policy of this Committee. However, the Committee makes grants in aid of publication, from the Johnson Fund when the project is in line with the policy of the Committee with reference to this Fund.

The following general principles have been adopted by the Committee which are not departed from except under extraordinary circumstances:

1. Grants will be made only for the promotion of research and chiefly in the fields represented by the membership of the Society.
2. Grants will not be made to pay salaries of members of the staff of an educational or scientific institution. It is expected that such institutions will co-operate by furnishing at least general lab-

oratory, library, and office facilities for those engaged in the investigation.

3. Grants will not be given for the support of professorships, fellowships, or scholarships, nor in general for work on doctoral theses. They will not be given for usual or permanent equipment of the institution involved. Special apparatus of permanent value purchased by means of a grant shall become the property of the Society, for such disposition as the Society may determine when the purpose for which it was purchased has been fulfilled.

4. Projects, methods of procedure, places where the work is to be done, and any co-operation of the institution where the research is to be conducted and of other institutions or agencies should be clearly stated.

5. Preference will be given to the support of investigations which are already well begun and in which definite results can be expected with the aid of the grant. Projects requiring long continued support cannot in general be assisted.

6. Any publication of work supported in whole or in part by a grant from this fund shall state in connection with the title that the work was supported by a grant from the particular fund of the American Philosophical Society from which the grant was made, and a copy of such publication shall be sent to the Society.

7. As a general policy the funds allocated to each project will be disbursed quarterly by the Society to those in charge, unless the nature of the work requires a different arrangement.

8. Reports of expenditures from grants are expected semi-annually, and a report of progress shall be made by the grantee to the Committee on Research annually. A summary of the work shall be presented to the Society for publication in its YEAR BOOK when that part of the work for which the grant was made is completed.

9. No recipient of a grant shall thereby become an employee of the Society.

Because of the participation of many scientific men in research connected with the war effort, particularly in certain fields, the request for grants during the past year has not been as large as previously. The Committee has not taken the occasion of the reduction in the number of requests for grants to lower the standards it has set for making grants. Also in some instances where grants have been made it has developed that it is not possible to carry out the research in the time contemplated, either because a recipient had been called into work in connection with the war effort or it was impossible to obtain certain apparatus in connection with the project for which the grant was made.

The Council at its meeting on November 19, and the Society at its Executive Session on November 20, voted that the balances in the Penrose, Johnson, and Daland Funds at the close of 1943 be established as a special fund, to be known as a "Reserve Fund for Post-War Expenditures" and that the money previously appropriated to a specific committee shall be available to that committee when needed unless the Council takes other action.

### THE PENROSE FUND

The budget for 1943 assigned \$75,000 from the income of the Penrose Fund for the support of research. To the sum of \$75,000 for research was added a balance of \$40,068.10 carried over from 1942 and refunds and cancellations amounting to \$3,112.28 so that a total of \$118,180.38 was available for grants. The Council at its stated meeting on November 19, and the Society at its Executive Session on November 20, approved the proposal of the Committee on Finance that \$20,000 of the accumulated balance in the Penrose Fund be made available for the purchase of manuscripts. The following 56 grants, plus 2 additional grants amounting to \$3,000 which were authorized in 1942 to be drawn from the 1943 budget were awarded totalling \$47,970 and leaving a balance of \$50,210.38 which will be transferred to the "Reserve Fund for Post-War Expenditures."<sup>1</sup>

Grant No. 676. Joint Committee on Coordination of Federal, State, and Local Taxation, New York, to find what can be done to simplify and coordinate the fiscal policies of the three levels of governments—Federal, State, and Local—in order to assure to each level adequate income at as low a total cost as possible to government and to the taxpayer .....	\$3,700
Grant No. 677. Einar Hille, Yale University, for assistants, typing, etc., for the preparation of a manuscript on The Analytic Theory of Semi-Groups .....	400
Grant No. 678. Alban W. Hoopes, Philadelphia, for travel, micro-films, for the preparation of a book on the history of the relations between the Indian tribes and the United States government, 1865-1900 ...	1,000
Grant No. 679. Hans Huth, National Park Service, Chicago, for travel, secretarial help, etc., in connection with the study on the means by which, in this country, history has been or can be visualized, in order to stir interest in history .....	300
Grant No. 680. Emil Liebmann, Duke University, for technical assistance, to investigate the role of lymphocytes in wound healing and regeneration; their function in determining regional specificity, polarity and gradients of regeneration and the ability to regenerate ..	1,000

<sup>1</sup> See p. 42.

Grant No. 681. John F. Normano, Research Bureau for Post-War Economics, New York, for assistance, travel, etc., for the investigation of the Western Influences in the Development of Economic Thought in Russia .....	400
Grant No. 682. Lloyd R. Watson, Alfred University, for technical assistance, for the development of the technique of the breeding of honeybees .....	500
Grant No. 683. William Herbert Hobbs, University of Michigan, for equipment, field expenses, travel, etc., for a study of the glacial history of the Columbia Plateau in Eastern Washington .....	500
Grant No. 684. Giorgio de Santillana, Massachusetts Institute of Technology, for secretarial assistance, travel, etc., for the preparation of an English edition of Galileo's "Dialogues on the two world systems, the Copernican and the Ptolemaic" .....	360
Grant No. 685. James A. Geary, Catholic University of America, for travel, subsistence, interpreter, to complete the editing of a mythological text in the Fox-Indian language, giving the complete story of the Culture-Hero Wisakheha. (Fourth grant.) .....	500
Grant No. 686. Charles Roberts Anderson, Johns Hopkins University, to complete the preparation and publication of the Centennial Edition of the Works and Letters of Sidney Lanier .....	2,000
Grant No. 687. George Steindorff, Walters Gallery, Baltimore, for the preparation of a Coptic Grammar in English .....	1,200
Grant No. 688. Mary L. Willard, Pennsylvania State College, for technical assistance, for the examination of optical properties of certain organic compounds such as that show types of dispersion such as pterates or pyridine and its homologues .....	200
Grant No. 689. John H. Storer, Waltham, Mass., for field work, in connection with the investigation of the use of the wing tips by birds in soaring and gliding .....	1,000
Grant No. 690. Nicholas A. Michels, Jefferson Medical College, for an artist in connection with a study of the varied blood-supply of the liver and gall bladder. (Second grant.) .....	100
Grant No. 691. Otto F. Meyerhof, University of Pennsylvania, Medical School, partly for equipment, technical assistant (1) a purification partial enzymes of glycolysis, (2) Mode of action of specific inhibitors of glycolysis and fermentation .....	1,500
Grant No. 692. Hans Nathan, Boston, Mass., for microfilms, photostats, travel, etc. for the preparation of a historical account of the music of Daniel Decatur Emmett .....	500
Grant No. 693. Albert Tyler, California Institute of Technology, for technical assistance for the continuation of methods of production and properties of univalent antibodies. (Fourth grant.) .....	600
Grant No. 694. Edward C. Armstrong, Princeton University, for the full-time services of Professor Foulet for a critical edition of Roman d'Alexandre. (Second grant.) .....	2,000
Grant No. 695. Edgar Zilsel, Hunter College of the City of New York, for maintenance and travel in connection with the study of the rise of the scientific methods from the end of the Middle Ages to Galileo. (Second grant.) .....	1,000
Grant No. 696. Henry Chandlee Forman, Wesleyan College, for the completion of a historical and archaeological research at St. Mary's City, Maryland .....	250

Grant No. 697. Hans Baron, Wellesley, Mass. maintenance and library fees for the preparation of two interrelated volumes on the intellectual and social aspects of the Renaissance in Italy, particularly in Florence .....	2,000
Grant No. 698. Thomas J. Wertenbaker, Princeton University, for secretarial work, travel equipment, microfilms, etc., for the preparation of a volume on <i>The Founding of American Civilization</i> ....	800
Grant No. 699. William Raymond Breneman, Indiana University, for animals, technical assistance for an analysis of the effects of sex hormones on pituitary function .....	500
Grant No. 700. William W. Krauss, New York, for travel, maintenance, photographs, etc., for the completion of a book <i>Race and Race Crossing in Man</i> .....	300
Grant No. 701. Willibald M. Ploechl, Catholic University of America, for travel, living expenses, etc., for an investigation of the History of the Oriental Catholics (Uniates) in Austria-Hungary from Joseph II till the Revolution in 1848 .....	500
Grant No. 702. Donald M. Pace, University of Nebraska, for equipment and assistants in connection with studies on the physical and chemical characteristics of the "growth substance" produced by <i>Chilomonas paramecium</i> .....	300
Grant No. 703. La Dema Mary Langdon, Goucher College, technical assistants, for studies in the comparative morphology and taxonomy of the Fagaceae. (Third grant.) .....	250
Grant No. 704. Martin Scheerer, College of the City of New York, for supplies, drawings, and clerical assistance in connection with the application in book-form of a holistic approach to pathological data .....	350
Grant No. 705. Kurt Pinthus, Washington, D. C., for maintenance while investigating, evaluating and surveying holdings of the Library of Congress in the field of drama and theater .....	1,800
Grant No. 706. Elsie Murray, Tioga Point Museum, for assistant, field work, typing, etc., collation of the history of the French Refugee Colony of 1793 on the Susquehanna and evaluation of its contribution to the development of the northern border. (Second grant.) ..	600
Grant No. 707. Samuel Preston Bayard, Allston, Mass., for maintenance, travel, etc., in connection with the finding and collecting of traditional ballads and songs with their airs .....	1,000
Grant No. 708. Edmundo O'Gorman, Brown University, for travel, photographs, and books for an investigation of the history of the "Concept of America" in western thought since the time of the discovery to our day .....	300
Grant No. 709. Hsio-Fu Tuan, Princeton University, to secure microfilms of <i>American Mathematical Journals</i> to be sent to China .....	150
Grant No. 710. Herbert C. Brown, Wayne University, for equipment and assistants for a study of the dissociation of addition compounds of amines and phosphines in the gas phase .....	1,000
Grant No. 711. Ella Cara Deloria, New York, for maintenance and travel for the completion and preparation for publication of an intensive account of Dakota Indian Ethnography .....	2,400
Grant No. 712. Helen Block Lewis, Columbia University, for assistants and clerical assistance for an experimental and theoretical study of the role of the ego in human behavior .....	350

Grant No. 713. Julius E. Lips, New York, for maintenance, travel, assistance, etc., for an investigation of early American Indian law and the effects of contact with the Hudson's Bay Company traders	1,800
Grant No. 714. Reginald Ruggles Gates, Marine Biological Laboratory, for travel and secretarial work for the preparation of a book on Racial Crossing	500
Grant No. 715. Charles Coleman Sellers, Wesleyan University, for maintenance for the research and preparation of a manuscript for the second volume of a biography of Charles Willson Peale	1,200
Grant No. 716. Cuthbert Lee, Asheville, for travel, clerical assistance, and supplies for the compilation of a publishable register of painted portraits in America	500
Grant No. 717. Emil Liebmman, Princeton University, for technical assistance for the continuation of the role of lymphocytes in wound healing and regeneration; their function in determining regional specificity, polarity and gradients of regeneration and the ability to regenerate. (Second grant.)	600
Grant No. 718. Elmer D. Merrill, Arnold Arboretum, for assistance to finish a comprehensive "Index Rafinesquianus"	600
Grant No. 719. Charles A. Berger, Fordham University, for part-time assistant for a comparative cytological study of prophase chromosome behavior at meiosis and mitosis in the polysomatic plant <i>Spinacia</i>	500
Grant No. 720. A. J. Haagen-Smit, California Institute of Technology, for assistants, for the investigation of the chemical isolation of embryo factors	1,500
Grant No. 721. Helen Lewis Thomas, Cambridge, Mass., for assistance, equipment, and travel, for a translation and commentary of Kepler's "De Stella Nova"	300
Grant No. 722. Carl C. Lindegren, Washington University, for an assistant in connection with the study of the biochemical characteristics of genetically controlled strains of yeast	600
Grant No. 723. Helen C. Palmatary, Philadelphia, for travel and living expenses in connection with the study of the archaeology of Marajó Island, Brazil. (Second grant.)	700
Grant No. 724. Herbert Friedmann, U. S. National Museum, Smithsonian Institution, for photographs, enlargements, etc., for a study of the symbolism and art-historical significance and history of the goldfinch motif in European devotional art	200
Grant No. 725. Alexander Sandow, Washington Square College of Arts and Science, for technical and secretarial assistance, supplies, etc., in the determination of the effects of pH, tissue poisons and anisotonicity on the mechanical events of the latent, contraction, and relaxation periods of muscular contraction. (Second grant.)	900
Grant No. 726. Floyd H. Allport, Syracuse University, for statistical and clerical assistance, card-sorting and punching service, etc., for an investigation of the degree of belief in certain subversive war rumors and the probable motivation for believing such rumors and transmitting them	200
Grant No. 727. Richard Norman Jones, Queen's University, Kingston, for a part-time assistant for an investigation of the ultraviolet absorption spectra of organic compounds	300

Grant No. 728. Bassett Maguire, New York Botanical Garden, for equipment and supplies, employment of collecting crew for an investigation of the vascular plant exploration in the interior tropical rain-forest and savannah areas of Surinam (Dutch Guiana), South America, and in the Para region of the lower Amazon River Basin	860
Grant No. 729. John F. Normano, Research Bureau for Post-War Economics, New York, for editorial and clerical assistance, in the continuation of the study of the Western Influences on the development of economic thought in Russia. (Second grant.)	200
Grant No. 730. Hermann Herrey, Harvard Faculty Club, for travel clerical help, drawing help for plans and diagrams to study the standards of planning for community activities and community centers	900
Grant No. 731. Diran Alexanian, New York, for translation and typing, services of an artist, musical copy and travel for the preparation of two volumes, the first The Physiological Basis of Musical Expressions, and the second The Technique of the Violoncello	1,000

The distribution of these grants to various subjects is shown in the following table:

	Grants	Amount
Class I. Mathematics	2	\$ 550
Chemistry	4	3,000
Class II. Geology	1	500
Zoology	7	4,500
Cytology	1	500
Botany	5	3,810
Anthropology	3	3,200
Psychology	3	900
Anatomy	1	100
Physiology	1	900
Class III. History, American and Modern	7	6,400
Economics	2	600
Jurisprudence	1	1,800
Class IV. Philosophy	1	1,000
History, Ancient and Cultural	2	2,100
History of Science	2	660
Archaeology	2	950
Philology and Languages	2	1,700
Literature	2	4,000
Art	2	700
Music	3	2,500
Miscellaneous: Committee on Urban Research	1	1,000
Community Activities and Centers	1	900
Dana System of Mineralogy	1	2,000
Joint Committee on Coordination of Federal, State, and Local Taxation	1	3,700
Total	58	\$47,970

A Summary of the research grants from the Penrose Fund made since the beginning of the Society's research program in mid-summer of 1933 is shown in the following table:

SUMMARY OF GRANTS AWARDED FROM THE PENROSE FUND  
From July 31, 1933 to December 31, 1943

	Grants	Amount	Refunds	Total
Class I. Mathematics.....	8	\$ 5,830.00		\$ 5,830.00
Astronomy and Astrophysics.....	33	32,950.00	\$ 3.78	32,946.22
Meteorology.....	4	2,232.00	21.75	2,210.25
Physics.....	73	75,312.53	2,864.66	72,447.87
Geophysics.....	3	4,200.00		4,200.00
Chemistry and Geochemistry.....	50	44,300.00	2,264.77	42,035.23
Engineering.....	1	75.00		75.00
Total.....	172	164,899.53	5,154.96	159,744.57
Class II. Geology.....	10	4,905.00		4,905.00
Paleontology.....	16	10,025.00		10,025.00
Geography and Physiography.....	3	1,200.00		1,200.00
Zoology.....	75	44,232.73	224.64	44,008.09
Genetics and Cytology	53	44,665.00	423.60	44,241.40
Ecology, Limnology, and Oceanography..	16	8,262.50		8,262.50
Botany.....	53	38,143.21	1,227.00	36,916.21
Bacteriology.....	6	3,300.00		3,300.00
Anthropology.....	17	23,500.00	2,146.14	21,353.86
Psychology.....	22	10,315.00	1,555.00	8,760.00
Anatomy.....	16	9,925.00	342.75	9,582.25
Physiology.....	62	52,160.00	452.34	51,707.66
Biochemistry.....	3	1,100.00		1,100.00
Pathology, Medicine, and Immunology..	14	10,400.00	249.06	10,150.94
Total.....	366	262,133.44	6,620.53	255,512.91
Class III. History, American and Modern.....	32	21,750.00	15.26	21,734.74
Political Science and Government.....	8	15,360.00	249.31	15,110.69
Economics.....	2	600.00		600.00
Sociology.....	3	2,000.00		2,000.00
Jurisprudence.....	1	1,800.00		1,800.00
Total.....	46	41,510.00	264.57	41,245.43



SUMMARY OF GRANTS AWARDED FROM THE PENROSE FUND—*Continued*

	Grants	Amount	Refunds	Total
Class IV. Philosophy.....	4	3,600.00	600.00	3,000.00
History, Ancient and Cultural.....	17	9,775.00	350.00	9,425.00
History of Science....	2	660.00		660.00
Archaeology.....	37	43,975.00	7,144.53	36,830.47
Ethnology.....	14	10,850.00	500.00	10,350.00
Philology and Languages.....	27	23,525.00	42.27	23,482.73
Literature.....	17	24,150.00	750.00	23,400.00
Drama.....	2	1,000.00		1,000.00
Music.....	7	5,900.00		5,900.00
Art.....	8	5,150.00		5,150.00
Architecture.....	3	2,700.00		2,700.00
Total.....	138	131,285.00	9,386.80	121,898.20
MISCELLANEOUS.....	19	41,150.00	9.45	41,140.55
TOTAL.....	741	640,977.97	21,436.31	619,541.66

Total appropriations July 1933 to December 31, 1943.....	\$690,000.00	\$711,436.31
Refunds and cancelled grants.....	21,436.31	
Total grants July 1933 to December 31, 1943.....	640,977.97	661,225.93
Expenses 1933-36*.....	247.96	
Transferred to the Committee on Library <sup>1</sup> .....	20,000.00	
Balance on hand December 31, 1943.....		50,210.38

\* After this date a separate fund was established for research expense.

<sup>1</sup> See p. 41.

## THE JOHNSON FUND

The budget for the year 1943 assigned the sum of \$19,000 for research from the income of the Eldridge Reeves Johnson Fund. To this was added \$13,540.76, unexpended balance carried over from 1942, making a total of \$32,540.76 available for grants to be awarded from this Fund during the year. The following five grants amounting to \$3,600, plus an additional grant of \$3,000 which was authorized in 1942 to be drawn from the 1943 budget, were approved during the year leaving a balance of \$25,940.76 which will be transferred to the "Reserve Fund for Post-War Expenditures."

Grant No. 53. Academy of Natural Sciences, Philadelphia. Completion of the authors' Catalog in the Library of the Academy .....	\$ 500
Grant No. 54. Academy of Natural Sciences, Philadelphia. Preservation and repair of old and most valuable books .....	500
Grant No. 55. Academy of Natural Sciences, Philadelphia. Part-time assistant, travel and field work, photography and miscellaneous expenses for studies on the geology and paleontology of the Atlantic and Gulf Coastal Plain by Horace G. Richards and Anne Harbison	800
Grant No. 56. Academy of Natural Sciences, Philadelphia. Preservation and repair of old and most valuable books. (Second grant.)	1,000
Grant No. 57. Academy of Natural Sciences, Philadelphia. Publication of "A Review of the Old World Euthymiae" by James A. G. Rehn .....	800

## THE DALAND FUND

The appropriation from the income of the Judson Daland Foundation for Research in Clinical Medicine at the beginning of the year 1943 was \$8,000 to which was added \$2,920, unexpended balance carried over from 1942 and a refund of \$131.79, making a total of \$11,051.79 available to the Committee on Research during the year 1943. From this sum the following two grants, amounting to \$7,500, were made leaving a balance of \$3,551.79 which will be transferred to the "Reserve Fund for Post-War Expenditures."

Grant No. 8. Philadelphia Institute for Medical Research, for continued support of the work of the Institute during 1943 .....	\$6,000
Grant No. 9. William R. Amberson, University of Maryland, for a technical assistant in connection with the development of hemoglobin-saline solution .....	1,500

## REPORTS FROM RECIPIENTS OF GRANTS<sup>1</sup>

(ARRANGED ALPHABETICALLY UNDER THE CLASSIFICATION OF  
SUBJECTS REPRESENTED IN THE MEMBERSHIP  
OF THE SOCIETY)

### CLASS I. MATHEMATICAL AND PHYSICAL SCIENCES

#### PHYSICS

VICTOR F. HESS AND F. A. BENEDETTO, Fordham University

Grant No. 665 (1942), \$100. I. Studies on mesotron disintegration and temperature effect of cosmic radiation. II. Studies on latitude and temperature effect of cosmic rays between New York and Valparaiso.

The dual telescope as described in the YEAR BOOK for 1941, pp. 98-100, was completely overhauled in the fall of 1942. A number of Geiger-Müller counters were repaired or replaced at the Bartol Research Foundation through the courtesy of Dr. W. F. G. Swann, funds for this purpose being generously granted from the Penrose Fund of the American Philosophical Society. The telescope was operated from January to August 1943, the data accumulated during that interval being substantially in agreement with the prior results obtained with this telescope.

It is shown that the correlations between ground intensity of mesotrons and atmospheric temperature are closer when the daily temperatures are integrated from the surface up to four-fifths of the atmosphere, integration being made over the daily temperature vs. pressure plot. Such temperatures are designated as mass temperatures. Both the correlation coefficient and the *mass* temperature coefficient are higher than those obtained by using only surface temperatures, or temperatures either of certain levels of the atmosphere, or integrated values for less than four-fifths of the atmosphere.

It is concluded that a more precise determination of the proper lifetime of the mesotron when based on the temperature coefficient should take into consideration the production, absorption, and energy distribution of the mesotrons *throughout* a considerable

<sup>1</sup> All grants are from the Penrose Fund unless otherwise specified.

fraction of the total atmosphere rather than by the simplifying assumption of mesotron production at a unique level. It is hoped that further work along this line can be undertaken at a later period as the present exigencies preclude that possibility at this time.<sup>1</sup>

### CHEMISTRY AND GEOCHEMISTRY

MARIETTA BLAU, Escuela Superior de Ingenieria, Mecanica,  
y Electrica

Grant No. 587 (1941), \$500. Investigation of the radioactivity of rocks and thermal springs in Mexico.

For making qualitative tests I had a Lauritsen electroscope. Quantitative measurements were made by the  $\gamma$ -ray-method with a Geiger-Müller counter. For measuring weak preparations for which I applied the  $\alpha$ -ray-method, as well as for emanation-measurements, a Lindemann electrometer was connected with appropriate ionization-chambers. Lacking other insulators, I insulated the electrode from the chamber-walls by a polystyrene plug, covering the same with a styron layer (a polystyrene preparation of excellent electric properties). This insulation worked out satisfactorily, when measuring currents up to  $5 \cdot 10^{-5}$  (e.s.u.), but failed, when measuring ionization currents of less intensity, especially during the rainy season, in spite of my using drying agents. It then appeared that the electrometer needle, which had been connected with the chamber electrode, did not deviate with uniform, but with retarded velocity. At the end the deviation of the needle approached asymptotically a final value which, however, cannot be exactly determined on account of the creeping of the needle. For this reason, the ionization currents were no longer proportional to the ratio of the potential to the time, as is the case when using perfect insulators. This is due to the fact that besides the ionization current, by which the electrometer is charged, there operates an Ohmic current, which passes the insulating plug and then goes to the earth. The two currents flow in parallel circuits. The ionization current can be described by the equation

$$I = \frac{V}{R \left( 1 - e^{-\frac{t}{RC}} \right)},$$

<sup>1</sup> Benedetto, F. A. Note on the mesotron temperature coefficient. *Phys. Rev.* 44: 317 (1943).

$R$  being the resistance,  $C$  the capacity and  $t$  the time necessary for charging the needle to potential  $V$ .

In order to avoid measuring  $R$  and  $C$  again and again, the following method may be applied for measuring small ionization currents (i.e. weak preparations), in case of unfavourable insulation conditions. With one and the same preparation are measured 3 or more time-values, which correspond to definite needle-potentials. Then the logarithms of the time-value are plotted on the X-axis and on the Y-axis the corresponding potential values from the above equation. Also the function  $y = (1 - e^{-x})$  is plotted in double logarithmic scale. When now the first curve is shifted parallel to the axes, so that the two curves coincide, the amount of the shifting in direction  $X$  will show the value of  $RC$ , and in the direction of  $y$  the value of  $R$ . The values of  $V$  and  $t$  being measured, the value of  $I$  can be calculated from the above equation. Since when  $t = \infty$  the equation reduces to  $I = V/R$ , it is possible to derive the value of  $I$  from the slope of the curve. That this method is correct was experimentally proved by using preparations where the intensity is known.

This method may also be used for measuring natural leak under favourable conditions (good insulation and small amount of humidity), especially for compensation currents, if the currents are very small and the insulators of relatively large dimensions.

With the means I had on hand, it was possible to measure a great number of minerals. Up to the present, there were found some kinds of mud with traces of radio-active substances, and two minerals with a higher percentage of radium.

One of these minerals is a pitchblende found in the State of Chihuahua, which is rich in uranium. As medium value of different measurements, 2, 59.10<sup>-7</sup> gm. Ra per gramme of ore could be stated. It may be concluded from the determination of the Pb-content, that this mineral cannot be older than 60 millions of years, which is in conformity with the geological date.

In the State of Guerrero a cinnabar-ore was found which is dispersed with tobernite of about 50% uranium.

From the geological viewpoint, it may be interesting that there were found minerals in mercury-mines, which contain uranium.

ELIZABETH RONA, Trinity College

Grant No. 619 (1942), \$1,000. Radioactivity of sea water.

The uranium content of ocean water samples of the Northern Atlantic, taken off Georges Bank,<sup>1</sup> were determined. A method of F. Hernegger and B. Karlik<sup>2</sup> was adopted for the separation of uranium from all other constituents of sea water. The optical method used by these authors for measuring the intensity of uranium was improved. The method utilizes the ultraviolet fluorescence of uranium. The residue remaining after the chemical separation is mixed with exactly 1 g. of NaF, and beads of 2 mm. of diameter are fused into platinum loops. The fluorescence spectrum was photographed with a very fast spectrograph<sup>3</sup> on superpanchro press films. The light emitted consists of 5 bands, from which those of 5570 and 5340 Å are the most intense, and were used for photometric comparison with the standards. To insure uniformity of mixing, the spectra of 10 to 20 beads of the same mixture were compared. If the deviations in intensity were above the admissible error, mixing was continued. Each sample containing unknown amounts of uranium was compared with beads of known uranium concentration. The following method of calibration was adopted. Replacing the slit with a step diaphragm,<sup>4</sup> calibration marks were put on each film,<sup>5</sup> and the spectra of the beads were photographed on the same film. The densities of the calibration marks as well as those of the samples were measured with a photoelectric densitometer,<sup>6</sup> and the ratios of the steps were plotted against their densities. In a second curve, intensities of the stand-

<sup>1</sup> Through the courtesy of the Director, C. 'O. D. Iselin, of the Oceanographic Institution of Woods Hole, Mass., sea water samples were collected from different locations and depths, by the crew of the "Atlantis," supervised by a member of the staff of the Institution.

<sup>2</sup> F. Hernegger and B. Karlik. Göteborgs kungl. vetenskap och vitter, saml. 5te följde, B. 4: No. 12 (1935).

<sup>3</sup> This spectrograph was kindly loaned to the author by Prof. R. W. Wood, Department of Physics, Johns Hopkins University, Baltimore, Md.

<sup>4</sup> Thomson, K. B., and Duffendack, O. S. Jour. Opt. Soc. 23: 101 (1933).

<sup>5</sup> Some of these experiments were carried out at the Department of Chemistry of the University of Michigan, Ann Arbor, through the courtesy of Prof. K. Fajans and Prof. Anderson, and at the Department of Physics of Stanford University, Calif., through the courtesy of Prof. Paul Kirpatrick.

<sup>6</sup> These measurements were carried out at the U. S. Department of Agriculture, Bureau of Plant Industry Station, Beltsville, Md., through the courtesy of Dr. S. B. Henricks.

ard samples were plotted against their densities. From these plots, a working curve was constructed, giving ratios of the steps against uranium concentration. The uranium content of the unknown sample was read from this curve.

Radium measurements were made previously<sup>1</sup> with portions of sea water, used for uranium determinations. The radium was extracted from 30 to 70 liters of sea water by the technique described by H. Pettersson and E. Rona.<sup>2</sup> Determinations of the Ra content in these extractions were made by W. D. Urry at the Geophysical Laboratory of the Carnegie Institution of Washington. The results of the radium and uranium measurements are given in the following table.

URANIUM AND RADIUM IN SEA WATER

Sample No.	Date	Lat.	Long.	Depths, meters		Ra in g. per liters $\times 10^{13}$	Uranium, g. per liters $\times 10^6$	Ratio, Ra to U $\times 10^7$
				Sam- ples	Bot- tom			
	1941							
P 295	May 31	40°22'N	66°34'W	200	2405	0.31 $\pm$ 0.02	0.84 $\pm$ 0.012	0.37
P 337	July 15	40°28'N	66°56'W	200	2390	0.25 $\pm$ 0.02	0.92 $\pm$ 0.02	0.27
P 339	July 15	40°28'N	66°56'W	484	2390	0.33 $\pm$ 0.02	1.00 $\pm$ 0.04	1.00
P 341	July 15	40°28'N	66°56'W	972	2390	0.33 $\pm$ 0.02	0.22 $\pm$ 0.02	1.64
P 336	July 16	40°05'N	67°38'W	2072	2390	0.34 $\pm$ 0.02	0.38	0.89
P 351	Aug. 8	40°07'N	67°12'W	2	2560	0.58 $\pm$ 0.02	0.75 $\pm$ 0.05	0.77
P 350	Aug. 8	40°07'N	67°12'W	497	2560	0.14 $\pm$ 0.02	0.30	0.47
P 349	Aug. 8	40°07'N	67°12'W	985	2560	0.35 $\pm$ 0.02	0.86 $\pm$ 0.05	0.41
P 348	Aug. 8	40°07'N	67°12'W	1982	2560	0.39 $\pm$ 0.02	0.75 $\pm$ 0.05	0.52
P 352	Aug. 9	39°10'N	66°31'W	2	4020	0.37 $\pm$ 0.02	0.5	0.74
P 353	Aug. 12	37°19'N	62°48'W	2	4940	0.24 $\pm$ 0.02	1.00 $\pm$ 0.23	0.24

The importance of these measurements is illustrated by examining the ratio of radium to uranium. In a system in radioactive equilibrium this ratio is constant and equals  $3.4 \times 10^{-7}$ . Sea water is deficient in radium compared with the uranium content. The

<sup>1</sup> These measurements were made as part of an extended investigation conducted at the Geophysical Laboratory of the Carnegie Institution of Washington by C. S. Piggot and W. D. Urry on the radioactive properties of ocean water and bottom sediments. Investigation of the radium content of ocean water and its variation with depths was undertaken by W. D. Urry with the author, who held a Research Fellowship at the Geophysical Laboratory, for this purpose.

<sup>2</sup> Pettersson, H., and Rona, E. Göteborgs kungl. vetenskaps-och vitterhets-samhällas. Handlingar, 5te följde. Ser. B. 6: no. 12 (1939).

average ratio from these measurements is  $0.66 \times 10^{-7}$ . Thus the radio elements in sea water are not in radioactive equilibrium.

It seems that radium is removed from sea water by a more efficient process than is uranium. Furthermore the radium in sea water is more uniformly distributed than the uranium. This may be due to the more labile chemical character of uranium which exists in more than one valence form, thus easily undergoing chemical changes caused by different environments.

The uranium content of the Mississippi, Hudson, and St. Lawrence Rivers were determined. They range from 0.44 to  $0.048 \times 10^{-7}$  g. per liter.

The second part of the investigation will consist of radium and uranium determinations of marine organisms to elucidate their role in the precipitation of these elements.

Thorium determinations on portions of samples of sea water used for these radium and uranium measurements are in progress.

SIMON FREED, University of Chicago

Grants No. 287 (1938), \$750; 408 (1940), \$800, and 588 (1941), \$1,200.

The structures of electrical fields about ions in solutions and related phenomena.

A. The investigation to make contact between line spectra from ions in solutions and thermodynamic chemistry has been advanced technically so that sufficiently precise data may be obtained. This work requires quantitative measurements of intensities of spectral lines absorbed by solutions in tubes about six meters long. In this manner equilibria will be determined between various configurations which are formed in homogeneous solutions by ions with their environments. Almost all the necessary measurements have been taken.

B. Spectroscopic studies of bivalent europium ions in crystals were undertaken in the hope that both sharp line spectra and diffuse spectra would co-exist and perhaps "interact," even at low temperatures, and that transitions in the crystalline state would be revealed which have some resemblance to pre-dissociation in gases. The features of the spectra arising from crystals at room temperature, and that of liquid nitrogen and of liquid hydrogen, conform in a general way with those anticipated.

The character of the spectra of the positive bivalent ion in crystals is strongly sensitive to the negative ions and the nature of



the crystal in a manner and to a degree hitherto unknown. Sharp lines in fluorescence and in absorption were observed from crystals at room temperature. Moreover, some diffuse spectra persisted even at the lowest temperatures. The sharp spectra arise in transitions between electronic configurations within the 4f shell, while the diffuse spectra originate when an inner electron is activated to orbits external to the ion, even to such loosely bound states which may represent dissociation because of the interaction between the activated electron and the ions of the lattice.

- FREED, SIMON, 1938 (with JACOBSON, H. F.). On the Symmetries of the Fields about Ions in Solution, Equilibrium between Forms of Different Symmetry. *Jour. Chem. Phys.* 6: 654-655.
- 1939 (with WEISSMAN, S. I., FORTRESS, FRED E., AND JACOBSON, H. F.). Ions of Europium Distributed between Different Configurations in Homogeneous Solutions. *Jour. Chem. Phys.* 7: 824-828.
- 1941 (with WEISSMAN, S. I., AND FORTRESS, FRED E.). The Absorption Spectra of Ions of Europium and the Electric Fields within some Coordination Compounds. *Jour. Amer. Chem. Soc.* 63: 1079-1085.
- 1942. Spectra of Ions in Fields of Various Symmetry in Crystals and Solutions. *Rev. Mod. Phys.* 14: 105-111.

MARY LOUISA WILLARD, Pennsylvania State College

Grant No. 688 (1943), \$200. Identification of various pyridines by means of the optical properties of their picrates.

In a general way, the study of the optics of crystals has already shown itself to be of significant scientific importance and promises to lead to further applications of industrial as well as scientific value. With the increased chemical interest in the pyridines and their isomers and homologues, methods of identity have been studied. Formerly, the melting points of the picrates of the pyridines have been used, not too satisfactorily, for their identification and to determine their purity.

In collaboration with H. L. Lovell, R. Gruver and others at Pennsylvania State College, the optical properties of the picrates of thirty pyridines have been studied and show considerable promise for use in a more rapid, easier, and more accurate characterization of the pyridines. The optical properties are particularly helpful where polymorphs exist or where melting points differ but slightly or are low melting.

The method of preparation of the picrates of the pyridines and

the equipment used in this work has become almost standard. The picrates of the three isomeric methyl pyridines, whose melting points are within a close range, can be easily and quickly identified by means of their extinction angle; they are respectively 2-methyl,  $43^\circ$ , 3-methyl,  $20^\circ$ , and 4-methyl,  $8^\circ$ . Another example of the usefulness of this method is in the examination of the picrates of longer chain homologues pyridines, 4-butyl, 4-amyl, 4-hexyl, etc., where the melting points become closer together and are lower; certain optical properties, refractive indices and optical axial angle can be used for their identification. Dispersion of various types has been noted on all crystals of the picrates of the pyridines and can also be used as an aid in identification.

It has thus been shown that optical properties of picrates of isomeric and homologues pyridines are of scientific value in their rapid and accurate identification.

## CLASS II. GEOLOGICAL AND BIOLOGICAL SCIENCES

### GEOLOGY

OREN F. EVANS, University of Oklahoma

Grant No. 622 (1942), \$100. Criteria for distinguishing between asymmetrical wave-formed ripple marks and current-formed ripple marks.

As a result of the discovery that wave-formed ripple marks may be asymmetrical in form there arises the necessity of determining the characteristics by which they may be distinguished from those formed by ordinary currents. Current-formed and asymmetrical wave-formed ripple marks are both formed on the bottom of water bodies and so are sometimes found preserved close together in the sedimentary rocks. This relationship may give valuable information regarding the conditions of deposition at the time of formation.

The principal criteria by which asymmetrical wave-formed ripple marks can be distinguished from those formed by currents are as follows:

1. Differences in longitudinal axes. The axes of ripples formed by oscillation waves are straight or, if curved, the curves are long and uniform and the axes of such a series show a large degree of parallelism. This results from the type of movement set up in the water by the generating waves. In current formed ripples the longitudinal axes lack this parallelism and the axis of each indi-

vidual ripple is crooked and irregular. This is because of the variation in velocity of the water current as it moves over the bed.

2. Differences in the angles at the top and bottom of the lee slope. A cross section through a wave-formed asymmetrical ripple shows a rounded condition of the crest and base. The current-formed ripple is frequently sharply angular at the crest and base and is always so if the current is of sufficient velocity to cause a steady flow of a majority of the sand grains.

3. Differences in uniformity of the height of the crest of the ripples above their troughs. Because of the uniformity of wave action the elevation of the crests above the troughs of wave-formed ripples varies little along the longitudinal axes but with stream ripples the irregularity in current movement and in the transporting power of the water causes both the crests and troughs of the ripples to be very irregular in height.

4. Differences in the shape of the ripples in the vicinity of obstructions. Where flat rocks or similar materials are present on the bottom the waves will build ripple crests across them with little or no sediment in the troughs. A stream current sweeps such surfaces clean. In case the rock projects some distance above the bottom, wave-formed ripples end close against the side of the rock but stream currents cause a digging out around the rock and the ends of the ripples are irregular and generally point down stream.

5. Differences in lunar shaped ripples. In the zone of waves of translation close to the shore ripples are often broken up into segments. The ends of these segments are always turned toward shore. Such ripples have crests and troughs of uniform elevation and width. Sometimes the two ends of the segment are forced forward so that the whole takes on a lunar shape. Horseshoe shaped ripples are often formed on stream beds but here they may have the ends pointing either up stream or down stream. Also the crests of such ripples vary greatly in height.

WILLIAM HERBERT HOBBS, University of Michigan

Grant No. 683 (1943), \$500. Study of the glacial history of the Columbia Plateau in Eastern Washington.

This grant was supplemented by a grant of like amount (Project 430-43), from the Geological Society of America.

The Scablands region in southeastern Washington State is an area of Miocene lava flows blanketed under heavy deposits of wind-

borne soil, which constitute the extremely rich wheatlands of the area, now in part included in the Columbia Basin Irrigation Project.

The peculiar topographic development of the basaltic lava of the area, already very extensively studied by geologists, has nonetheless remained a largely unsolved problem, and the origin of the rich soil has also been awaiting a solution.

Studies which during the last decade had been carried out by the grantee in Greenland, and a more recent comprehensive investigation of the "Glacial Anticyclone and the Continental Glaciers of North America"<sup>1</sup> afforded him, he believes, certain advantages over others in attacking this vexed problem.

Five weeks during the months of June and July last were spent in field work (only one-half the time anticipated), and the general solution of the problem was reached despite inhibitions which were imposed by wartime conditions. Return after five weeks study was necessary because without the use of a motor car the parts of the area not already visited were inaccessible. One-half of the grant from the Geological Society has already been returned, and unless an early end of the war should permit a second visit to the area under conditions much more favorable than now, a like amount will be returned to the Society.

The studies already carried through have shown that the Scablands were in Late Pleistocene time overridden by a lobe of the Cordilleran glaciation which hitherto had not been suspected. This lobe, which covered nearly 4,000 square miles, I have named the Scablands Glacial Lobe. Its existence is now proven by the discovery of a marginal moraine at many localities along its border, as it is also by the loess deposits.

The presence of this Scablands Glacial Lobe made a dam of ice which blocked the course of a glacial ancestor of the Spokane River to form Glacial Lake Spokane. This lake covered some 3,000 square miles and drained through spillways to the Snake and Columbia Rivers. It has been possible also to work out in some detail the several recessional stages of the Scablands Lobe before its final dissolution.

With the evacuation by the lobe of all the Scablands area and the retirement of its front behind the Spokane and Columbia,

<sup>1</sup> Hobbs, W. H. Proc. Amer. Philos. Soc. 86: 368 (1943).

Glacial Lake Spokane expanded down the canyons of these rivers as a much enlarged lake which I have named Glacial Lake Leverett, after the distinguished glacialist who was a member of the Society. This lake found its outlets to the lower Columbia by cutting the grand and Moses Coulees. The cataract which was in the former had a direct fall of over 800 feet and a width of several miles, the greatest feature of the kind that is anywhere known.

The origin of the rich deposits of loess (soils once wind-borne) has been solved, for their distribution and varying thicknesses peripheral to the Scablands lobe has indicated beyond peradventure that they were spread from this central ice lobe by the outward-blowing winds of the glacial anticyclone.

With the permission of both sponsoring societies a preliminary notice on the results of this research was published in *Science*<sup>1</sup> in its issue of September 10, 1943. A paper with the same subject was read at the Autumn Meeting of the Society.

The full report upon this research together with maps and plates is now in preparation. The Geological Society has asked for permission to publish it, and since on this plan it would reach a larger number of interested scientists, I have offered it to that Society.

## GEOGRAPHY

LAWRENCE MARTIN, Library of Congress

Grant No. 443 (1940), \$600. Completion and verification of a manuscript dealing with Captain Nathaniel Brown Palmer's Antarctic explorations between 1819 and 1831.

The manuscript has progressed substantially toward completion, having been amplified upon the basis of previously unidentified contemporary information during 1941, 1942, and 1943. Map illustrations have been compiled and advanced toward readiness for fair drawing. Facsimile illustrations include evidence not known to the recipient of the grant in 1940. Photograph illustrations are in process of accumulation and arrangement; these will include airplane pictures and ground and sea-surface pictures whose use by the eventual publishers of the book or report will be permitted, as is hoped, by the U. S. Antarctic Service, the Smithsonian Institu-

<sup>1</sup> Hobbs, W. H. Discovery in eastern Washington of a new lobe of the Pleistocene Continental glacier. *Science* 98: 227-230 (1943).

tion which administers the Walter Rathbone Travelling Scholarship, the Universal News Service, and various European explorers. The situation has brightened with respect to a large group of vexatious place-name problems; many of these had seemed to present insoluble dilemmas affecting not only the manuscript whose completion and verification is supported by Grant No. 443 but also a group of scientific reports which the American Philosophical Society is now carrying forward toward publication.

Rearrangement, simplification, and grantee's editing of the manuscript have profited greatly through suggestions and criticisms by President Edwin G. Conklin, Professor William H. Hobbs, Dr. Leicester B. Holland, Dr. Hunter Miller, and several other scholars. The final draft will be substantially improved as a result of their aid. Newly rediscovered contemporary evidence, alluded to below, has already resulted in rearrangement and rewriting of certain critical portions of the manuscript.

The most spectacular items of evidence not previously announced lead to the conclusion that an American from New England seems to have been the first man ever to have seen the seventh continent. It will be recalled that there has not been perfect unanimity in English-speaking countries on opposite sides of the Atlantic as to whether Antarctica was first seen by Captain N. B. Palmer in the sloop *Hero* in November 1820 or by Captain Edward Bransfield in the brig *Williams* in January or February of that same year.

It may now be shown that Antarctica was seen from the American brig *Hersilia* in December 1819; Bransfield did not even reach the South Shetland Islands north of the Palmer Peninsula of Antarctica until January 16 of the following year. The proofs are in the official records of the United States. General Daniel Parker of the War Department, John Quincy Adams the Secretary of State, and James Monroe the President of the United States, each read this evidence in August or September 1820 and, without demur, took significant action. Whether James P. Sheffield the master of the *Hersilia*, or N. B. Palmer his keen-eyed second mate, or still another member of the crew was on watch and looking landward when the brig anchored "*a short distance from the Mainland*" cannot be determined without further investigation.

MARTIN, LAWRENCE, 1943. Early Explorations and Investigations in Southern South America and Adjacent Antarctic Waters by Mariners and Scien-

tists from the United States of America. Proc. Eighth Amer. Sci. Congress, Department of State, Washington, D. C. 9: 43-46.

— ibid., The Polar Times, No. 14, 18.

## ANATOMY AND ZOOLOGY

GEORGE S. AVERY, JR., Connecticut College

Grant No. 631 (1942), \$1,500. Occurrence of the physiological active substances, presently known as plant auxins, in the endocrine glands and certain other organs of higher animals.

Acetone, alcohol, ether, and water extraction (and alkaline hydrolysis) were all employed in extracting auxin from certain animal tissues; the *Avena* method was used for quantitative assays. Small yields were obtained from calf thymus, pancreas, kidney, spinal cord, blood, thyroid, cerebellum, duodenum, and stomach wall; the auxin content was higher for the adrenals and pituitary. From two calves on controlled diets high in synthetic auxin, the auxin was not recoverable from the glands and organs tested, nor was any appreciable amount recoverable from the urine.

Rats on controlled diets high in naturally occurring and synthetic auxins gave the following results: those fed corn containing a high concentration of potential auxin, gave auxin yields for adrenals, pituitary, salivaries, testes, and thymus markedly higher than the controls, other glands and organs were not significantly higher than the controls. Thus one may conclude that there is a tendency for auxin accumulation in certain glands. Similar results were obtained when synthetic 3-indoleacetic acid was supplied in the diet, thus confirming the work with corn (indoleacetic acid is the naturally occurring auxin in corn). A second synthetic auxin ( $\alpha$ -naphthaleneacetic acid) supplied in the diet, showed the greatest accumulation in adrenals, salivaries, liver, pancreas, and testes, somewhat less in the thymus and kidney, and still less in the brain; the pituitary showed little or no increase over the control.

With indoleacetic acid, the increases ranged up to thirty-three times the controls, with naphthaleneacetic acid up to eight times the controls. The former is known to be approximately five times as active on *Avena* as the latter (per unit weight), thus it appears that the accumulation of the two synthetic auxins is in approximately equal amounts, by weight.

OTTO C. GLASER, Amherst College

Grant No. 604 (1941), \$691.98. Spectroscopic analysis of mineral metabolism in developing *Fundulus* eggs.

From fertilization to hatching the teleost egg allegedly absorbs no salts. Since this statement leads to absurdities it seems likely that the quantitative differences require methods more sensitive than any hitherto employed.

Our material consists of about twelve series of *Fundulus heteroclitus* eggs. Each series was fertilized with sperm from a single male and derives from a single female. In every lot all eggs noticeably aberrant in size were immediately discarded. The remainder were cultured in finger bowls containing 100 ml. sea water of known density replaced daily. Measurements enabling us to calculate the volume of the perivitelline space were made daily on one egg from each culture. The external jelly known to be rich in salts was then removed by rolling the egg on ash-free filter paper by means of a small clean rose-wood stick. The egg was then transferred to a second piece of ash-free filter paper of known weight enclosed in a weighing tube, and weighed to 0.01 mg. The tube was then opened in a dessicator kept dry by conc.  $\text{H}_2\text{SO}_4$ . Finally the dry egg covered with its ash-free filter paper was transferred to an individual vial.

For the spectroscopic analysis of this material we are employing a spectrograph constructed, calibrated, and operated by Dr. George P. Child. The proper housing of this instrument was a serious problem and as the work progressed numerous refinements became necessary. Other refinements are still in progress. At present Dr. Child is concerned with methods for the simultaneous analysis for Na, K, Ca, and Mg. While the advantages of such analyses are obvious, the problem now requires the use of a spectral region where only fairly rather than maximally sensitive lines for all four elements are to be found.

Our preliminary analyses in regions of maximal sensitivity for each element separately, as yet allow no rigidly quantitative statements but do permit a qualitative preview of the behavior of four elements. Newly hatched fish minus vitelline membranes contain more K, Ca, Mg, and Fe than eggs, plus vitelline membranes, shortly after insemination. Of these four metals K increases the least, Ca and Mg stand intermediate, while Fe increases by far the most.



RUDOLF ALTSCHUL, University of Saskatchewan

Grant No. 469 (1940), \$300. A. Distribution and topography of the tortuous vessels in the brain, their individual variations and possible connection with brain diseases, especially with the bleeding and softening; B. Distribution of lipofuscin in human brain, especially in the basal ganglia.

The investigation of the convoluted vessels of the brain and spinal cord has been completed and will appear in the *Journal of Neuropathology and Experimental Neurology*.

The publication consists of two main parts. The first deals with the characteristic of the convoluted vessels and their occurrence in the border zone between grey and white substance of the brain and spinal cord. An attempt is made to classify the areas of the normal central nervous system as to the frequency of convoluted vessels.

The second part deals with the occurrence of convoluted vessels under pathological conditions. Numerous brains with malacic foci were examined and two brains with focal hemorrhages were thoroughly searched. There was no evidence to support the belief of other authors that the formation of vascular convolutes is caused by shrinkage of parenchyma.

In six brains of genuine epilepsy the convoluted vessels were found to be more numerous; in some these occurred in the grey substance proper, in some they did not. In one negative and two doubtful cases of epilepsy, convoluted vessels were found in the pia. It appears necessary to exert caution in valuing these findings since pial vessels may become tortuous artificially.

In two cases of Huntington chorea convoluted vessels were found to be more numerous and to be situated deeper in the white substance than normal. One case reported as Huntington chorea was negative as far as it was searched.

F. B. ISELY, Trinity University, Texas

Grant No. 636 (1942), \$600. Ecological factors affecting Texas Orthoptera.

This progress report concerns the first of a series of short papers which will briefly summarize the writer's field observations (1931-43) which have a bearing on the ecology of the Texas Orthoptera.

The paper<sup>1</sup> here previewed gives a brief account of field studies of those species which belong to the orthopteran families Blattidae and Gryllacrididae. The chief reason for coupling these families in one paper is due to a similarity in their chemitropic behavior. Species of both families are nocturnal and highly secretive. Ordinary collecting methods fail utterly to give pertinent ecological data. However, with the aid of "jug traps" baited with diluted molasses, tainted with amylic alcohol, significant facts concerning their populations, local distribution, habitat preferences, life histories and other ecological data may be secured.

Field studies were made chiefly in northcentral and southcentral Texas. Over forty separate trapping trips, testing out various types of habitats, in sixteen different Texas counties were undertaken. Favorable habitats were retrapped especially to secure information concerning seasonal succession and life histories. For the male Blattidae light trapping was also employed. Special daylight collecting methods consisted in the turning over of rocks, logs, and other debris in order to search out possible hiding places and microhabitats. Twenty-six species of the Texas Blattidae and Gryllacrididae (*Ceuthophilus*) were collected. Twelve of these species were secured in sufficient numbers to afford significant ecological data.

ISELY, F. B., 1939. Report of Progress. Yr. Bk. Amer. Philos. Soc. for 1938: 190-191.

—— Correlation between Mandibular Morphology and Food Specificity in Grasshoppers. (Accepted for publication in the Annals Entom. Soc. of Amer.)

#### EMIL LIEBMANN, Princeton University

Grants No. 680 (1943), \$1,000 and No. 717 (1943), \$600. Studies on the role of lymphocytes in wound healing and regeneration; their function in determining regional specificity, polarity, and gradients of regeneration and the ability to regenerate.

Lymphocytes of a trophic character, i.e. trephocytes and the lymph system in general, were found to be the main determinant in regeneration of the earthworm, *Eisenia foetida*, Sav.

<sup>1</sup> Field Studies of Texas Orthoptera, I. Families Blattidae and Gryllacrididae.

During this process the trephocytes act as aggregates or organs of a distinct form, having but a single function, viz., that of supplying the restituting region with nutritive and growth substances. In some respects their activity resembles that of secretory organs. No regeneration takes place in their absence.

Two kinds of these organs were detected: a head organ and a tail organ. The first is of a permanent nature, the other is formed only prior and during tail restitution. This and other differences were found to be responsible for the mutual independence of cephalic and caudal regeneration and their respective gradients.

The two organs were each found to exhibit distinct morphological and functional traits. Their cells show specific cyto-chemical characteristics and can easily be distinguished as head lymphocytes and tail lymphocytes. The special nature of both these organs, their cells and secretions, suggests that they may contain or represent specific formative substances: a head and a tail substance.

Both organs were found to be polarized and to act in one direction only. Several observations indicate that the direction, and possibly the polarity, of both the regeneration process and the regenerate are in some way effected by the action of these cell aggregates.

The rate and amount of regeneration are, within limits, proportional to the number of trephocytes available for this process. The limits and gradients of head or tail restitution were also observed to be determined by the extent and the differential in the amount of these cells along the main body axis.

Experiments were performed in order to demonstrate the morphogenetic action of the lymph organs described. Partial or total removal of the head aggregates caused inhibition or suppression of cephalic restitution. The quantitative aspect of the problem thus appears to be established. A few individuals reformed anomalies or monstrosities, indicating that a qualitative factor may be involved.

To elucidate further the latter point, the cephalic region was removed and head lymphocytes were injected into the remaining caudal section. One of the two experiments so far completed resulted in 75 percent regenerates macroscopically resembling heads; no histological study, however, has as yet been made to establish definitely their cephalic nature. The experiments are being continued.

LIEBMANN, EMIL, 1943. New Light on Regeneration of *Eisenia foetida*, Sav.  
Jour. of Morph. 73: 588-610.

NICHOLAS A. MICHELS, Jefferson Medical College

Grants No. 615 (1942), \$200, and No. 690 (1943), \$100. Variations in the blood supply of the liver, gall-bladder, stomach, duodenum, and pancreas.

As in the case of the spleen the arterial vascularization of the liver is so markedly different that in the seventy-five bodies thus far investigated no two patterns are the same. The hepatic showed variations in the number, caliber, origin, and distribution of its main branches (2-5), the small terminal branches (10-65) being prevailingly distributed to the caudate and quadrate lobes. Accessory right hepatics from the celiac and superior mesenteric occur frequently. The accessory left hepatic from the left gastric invariably sends branches to the esophagus and stomach.

The right hepatic is prevailingly dorsal to the common hepatic duct. In instances it winds around it, i.e., passes from a ventral to a dorsal position, thus forming a loop around the duct. Jaundice may result from compression of the hepatic duct by such a looped artery. Branching of the right hepatic may occur early or late. When early, a branch—the inferior lobular—is often distributed to a notched area of the liver which underlies the gall-bladder. Severance of this inferior lobular artery along with the cystic or instead of it, may be the direct cause of liver shock which at times follows cholecystectomy. An accessory right hepatic from the superior mesenteric usually courses dorsal to the portal vein. It may give off the cystic, left gastric, right gastroepiploic or the retroduodenal.

Typically the cystic arises from the right hepatic to the left of the hepatic duct. After a short or long course it divides into a superficial and deep branch. The latter is the most important as it is distributed to the medial, non-peritoneal surface of the gall-bladder where it is often hidden by connective tissue. The site of origin of the cystic may be high or low; when very low, it usually arises from an ultimate branch of the right hepatic and is extremely difficult to dissect. When the cystic takes origin to the left of the hepatic duct it is usually longer, passes anterior to the duct, the right hepatic being behind it. Many bodies have a double cystic, i.e., the superficial and deep branches arise as separate arteries from the right hepatic or its branches. Occasionally the

superficial branch arises from the superior mesenteric or from the retroduodenal.

Similar orientation of the cystic artery to the common hepatic duct and cystic duct is of sufficient constancy to warrant the concept of a cystic triangle the boundaries of which are: infero-laterally, the cystic duct; medially, the common hepatic duct; cephalad, the cystic or right hepatic.

Three types of union of the cystic duct and common hepatic duct were encountered: angular, parallel, and spiral. Site of union is more frequently low than high. When extremely low (at or just above the superior border of the duodenum), care must be taken in those instances in which the cystic duct runs posterior to the hepatic duct for 1-2 cm. before entering the common bile duct. Dealing with such an anomalous cystic duct the surgeon may inadvertently ligate the common hepatic duct instead of the cystic. Accessory hepatic ducts may present dangerous arterial relations.

Nearly all texts on anatomy and surgery fail to describe the following important arteries:

1. The retroduodenal (posterior superior pancreaticoduodenal). This large (1-3 mm. in diameter), frequently tortuous artery occurs in all bodies, usually as the first branch of the gastroduodenal, of which in instances it is a continuation. After an abrupt course downward and to the right it passes anterior to the supraduodenal part of the common bile duct, then posterior to the intrapancreatic part of the duct, being distributed in arcade fashion on the posterior surface of the head of the pancreas. From this posterior arcade and its subdivisions (secondary and tertiary arcades) branches are supplied to all three parts of the posterior surface of the duodenum but in a more copious manner than are distributed the anterior branches from the anterior arcade formed by the superior pancreaticoduodenal and inferior pancreaticoduodenal. The retroduodenal unites with a posterior branch of the inferior pancreaticoduodenal or joins the superior mesenteric or a jejunal branch independently. The artery gives fine anastomosing branches to the pancreas, larger ascending and descending branches to the common bile duct and in instances supplies the superficial cystic. In certain bodies the retroduodenal forms an arcade only for the first and second part of the duodenum; the third part then has a separate arcade (from the inferior pancreaticoduodenal), the fine branches of which unite with the major arcade.

Aside from its surgical importance in ligations and transplantations of the common bile duct the retroduodenal is the artery involved in hidden bleeding which often follows spontaneous rupture of the posterior duodenal wall by ulceration.

2. The supraduodenal artery of Wilkie. It is a small artery distributed to the upper border, anterior and posterior surface of the first part of the duodenum. It usually arises from the gastroduodenal below the retroduodenal. Often it is not an independent artery, but a branch of the retroduodenal or right gastric. It gives branches to the pancreas and common bile duct. It is not an end artery (Wilkie) as it frequently anastomoses with the right gastric, superior pancreaticoduodenal, retroduodenal, and via a transverse branch with the splenic.

3. The dorsal pancreatic (superior pancreatic). It is fairly constant, relatively large (1-5 mm.) and is distributed to the posterior surface of the pancreas. It arises from the celiac, the first part of the splenic or hepatic, from the superior mesenteric, middle colic, accessory right hepatic, left inferior phrenic or aorta. When it arises in conjunction with the left gastric, splenic and hepatic from the celiac the latter is a tetrapod. The artery passes dorsal to the splenic vein to reach the mid-region of the neck of the pancreas where it terminates into a (*a*) left branch (the transverse pancreatic) which courses toward the tail of the pancreas; (*b*) a right branch which unites with the gastroduodenal, superior pancreaticoduodenal, right gastroepiploic or inferior pancreaticoduodenal. A branch of the dorsal pancreatic often supplies the uncinate process. The artery may establish an anastomosis with the arcade of the retroduodenal; it may give origin to an accessory right hepatic, to the right, left, and middle colic.

4. The transverse pancreatic (inferior pancreatic). This relatively large artery (1-4 mm.) nearly always courses along the inferior (dorsal) border of the pancreas, from the neck of the organ to its tail. Here it anastomoses with a branch of the pancreatica magna from the splenic trunk or with the *a. caudae pancreatis* from the splenic terminal. As a rule the transverse pancreatic is the prominent left branch of the dorsal pancreatic. In instances the latter may give off two transverse pancreatic arteries. Other sites of its origin are: the gastroduodenal, superior pancreaticoduodenal, right gastroepiploic, inferior pancreaticoduodenal, and superior mesenteric. It may be sufficiently large to constitute a splenica

secunda to the spleen. Its posterior epiploic branches (2-5) course through the transverse mesocolon affording the transverse colon with an added blood supply.

MICHEL, NICHOLAS A., 1943. The Variational Anatomy of the Hepatic and Cystic Arteries. *Anat. Rec.* 85: 41.

CARL CASKEY SPEIDEL, University of Virginia

Grant No. 673 (1942), \$200. Investigation with the aid of ciné-photo-micrography of the reaction of cells and tissues in living frog tadpoles as the animals are subjected to various experimental conditions.

During the past year a major phase of investigation has dealt with the nerves and special sensory organs of the lateral-line system. An intensive study has been made of these organs after experimental denervation. Individual organs have been kept under observation for prolonged periods in living frog tadpoles.

Suitable experiments combining lateral-line nerve section with tail tip amputation show that denervated lateral-line organs are quite capable of regeneration. They furnish placode material which rapidly grows into the regenerating tail tip and differentiates into new lateral-line organs provided with the characteristic sensory hair cells. Lateral-line nerve influence is quite unessential for regeneration of this sort.

Furthermore, lateral-line organs are capable of surviving for a long time after denervation. Very little change is noticeable for a month or two. Some denervated organs have now been kept under observation for more than ten months. Typical sensory hair cells are still present in these.

Nevertheless, my observations reveal that the lateral-line nerves have a definite trophic influence on the organs. With the normal growth in size of a tadpole an innervated organ gives rise by budding to a cluster of organs. Small clusters grow into larger ones. In contrast a denervated organ does not give rise to a cluster; nor does a denervated cluster of organs grow into a larger cluster. Instead, over a prolonged period of several months there is definite regression and loss of organs. Many clusters become reduced to single organs. Thus, in the same tadpole a striking difference finally becomes noticeable between the organs in normally innervated and experimentally denervated zones.

Retraction bulbs of irritation may be readily induced on the sensory hairs that protrude from lateral-line organs. With re-

covery the hairs lose the bulbs, grow out again, and resume the normal pointed state. There is no difference noticeable in these reactions in the hairs of normal and denervated sensory organs.

Bunches of orange-colored granules in the sensory cells are conspicuous features of the lateral-line organs of freshly collected tadpoles. Under laboratory conditions these disappear within a period ranging from a few days to a few weeks, in both normal and denervated organs. If the tadpoles are replaced in their natural pond environment, orange granules are regenerated in both normal and denervated organs.

Other observations include prolonged histories of sterile distal nerve stumps, details of methods of re-innervation of distal stumps, and many instances of aberrant nerve fibers and lateral-line organs. Ciné-photomicrographic records have been made of many phases of this study.

Another phase of investigation was presented to the Society at the 1943 Autumn Meeting. A motion picture film was exhibited, entitled "A ciné-photomicrographic study of the activities of lymph vessels and macrophages in the disposal of extravasated red blood cells." This film portrayed the fate of extravasated red blood cells in living frog tadpoles, including both the early processes of salvage and the late processes of destruction.

Salvaging of an extravasated red blood cell is accomplished as follows: a sprout arises from a nearby lymph vessel and grows toward the blood cell; the tip of the sprout encircles the cell and draws it into its lumen; the red blood cell is then carried by the lymph circulation to its junction with the blood circulation. Unsalvaged red blood cells remaining in the tissues for more than two days are ingested and destroyed by scavenger white blood cells (macrophages).

The motion pictures present the following cases: (1) lymph sprouts picking up extravasated red blood cells from a hemorrhagic zone a few hours after injury; also on the following day; (2) a lymph sprout taking in red blood cells, one by one, from sixty-five to one hundred thirty minutes after injury; also during the following two days; (3) partial extrusion of a red blood cell and ingestion of the cytoplasm only by a lymph vessel, the nucleus remaining in the blood vessel; (4) division of a lymphatic endothelial cell of a lymph vessel with subsequent opening, extension, closing, retraction, and loss of side branch; (5) history of a small hemorrhagic



zone over a four-day period showing the origin of a nearby lymph sprout, salvaging of blood cells, and final retraction of the sprout after the hemorrhage has cleared up; (6) ingestion and digestion of worn out red blood cells by scavenger macrophages (several examples); (7) some cases of unsuccessful ingestion; (8) migration of lymphocytes along a blocked lymph vessel; (9) intravascular phagocytosis within a lymph vessel whose drainage has become blocked; (10) entrance of a macrophage into a blood vessel (diapedesis) following the clearing up of the hemorrhage.

SPEIDEL, C. C., 1940-42. Reports of Progress. Yr. Bk. Amer. Philos. Soc. for 1939: 292-294; for 1940: 251-252; for 1941: 142-143; for 1942: 140-141.

LLOYD R. WATSON, Alfred University

Grant No. 682 (1943), \$500. Development of the technique of the breeding of honeybees.

The economic importance of the honeybee is a growing consciousness in modern agriculture. No other agency for the pollination of bloom is so well adapted to the extension and control of man, but the honeybee is essentially a wild creature changed almost not at all by centuries of manipulation by man. In keeping with the forward movement of modern agriculture new and improved types of honeybees are greatly needed.

The science of beekeeping may be approached in one or the other of two ways; first by the way of environment and second by the way of heredity. The history of beekeeping throughout the world reveals that during the 3000 years of recorded bee husbandry the first approach, the environmental, has received by far the most attention with only slight attention to the second or hereditary approach. This one-sided devotion is due to well known causes, particularly the lack of control of the mating of the queenbee. Until comparatively recently man has been denied the control of the male parentage of his bees. Now, at last, control of the mating of the queenbee may be effected under laboratory conditions by a process of artificial insemination. The techniques thus far developed to accomplish this delicate operation do not usually result in as copious filling of the spermatheca with sperms as occur in natural matings, but still copious enough in most cases to permit of any ordinary genetical studies.

The breeding of honeybees has been successfully carried from generation to generation by the expedient of artificial insemination by the U. S. Department of Agriculture, and by several private investigators in this and in other countries. The details of the procedure have been varied within narrow limits by the different users but the technique consists essentially in injecting semen from a selected drone into the vagina of the virgin queen by means of a small glass syringe. The drone is first killed and his semen is taken up into the syringe from the seminal pouch after he has been induced to ejaculate, or if he cannot be induced to ejaculate the sperm is taken directly from the seminal vesicles. In preparation for this operation the virgin queen is tied down on a tiny operating table with silk thread and the procedure is carried out under the lenses of a binocular microscope.

After depositing the charge of semen within the vagina of the queenbee the experimenter has been compelled to rely upon the workings of nature to effect the transfer of the sperm anteriorly along the vaginal tract, past the valve fold into the oviduct and thence dorsally along the tortuous spermathecal duct into the spermatheca. The goal of instrumental insemination is to fill, even to pack, the spermatheca with sperm, and to achieve this without the slightest injury to the delicate tissues of the queen. The principal obstruction in the passage of the sperm to the spermatheca has seemed to be the narrow arching valve fold. In the routine injecting of large numbers of queens a few receive copious inseminations but the majority of queens treated receive less than 5 percent of the normal degree of insemination, and some only traces of sperm in the spermatheca. All users of this technique insist upon full adolescence in their cultures, but after adolescence has been reached by the insects the age of the drones and of the queens exhibit no marked correlation with the degree of insemination.

It is a disturbing fact that since the development of the technique of instrumental insemination of queenbees by the present author in 1926 little progress in its improvement has been made by its numerous users. All workers have obtained about equal success with the method, and no one has reported any startling improvement in its use. One worker<sup>1</sup> has claimed some improvement

<sup>1</sup>Laidlaw, Harry Hyde. The morphological basis for an improved technique of artificial insemination of queenbees of *Apis mellifica*, Linnaeus. Thesis offered for the degree of Ph.D., University of Wisconsin, 1939. (Not published.)

in results by a modification of the usual technique in which he depresses the valve fold with a small probe manipulated through the vaginal orifice. This procedure has not been verified by other workers.

Late in the bee-breeding season of 1943 a modification of the technique hitherto followed in injecting the queen was tried. A seminal vesicle, turgid with sperm, was taken from a drone that had been killed without ejaculating. The tracheal mantle was dissected away under water, and the whole organ, cleared of adhering tissues, was taken up into the syringe. The syringe barrel was made in cylindrical form for this purpose and of such bore as to receive the seminal vesicle without forcing out any of its contents. This sac of sperm was then injected bodily into the vagina of the queen, open end first, and sealed in with a generous smear of mucus from the same drone over the vaginal orifice. This procedure possesses the advantage that the seminal vesicle can be placed in correct position in the queen with shallower insertions of the syringe thus lessening the danger of injuring delicate tissues, and if in filling the syringe the mucus is taken up first followed by the seminal vesicle, then as the syringe is emptied into the queen the seminal vesicle enters first followed by the mucus, all in one motion of the plunger.

Thirty-three virgin queens were injected with seminal vesicles bodily. From one to three days later they were autopsied and the contents of the spermatheca examined with the aid of a microscope. Of this number two queens received no sperm in the spermatheca.

18	queens	received	from	1%	to	25%
9	"	"	"	26%	"	50%
4	"	"	"	51%	"	100%

The average degree of insemination for the 33 queens was 30 percent. Experience has shown that queens receiving as few as 5 percent of the normal number of sperms may lay several hundred fertilized eggs, and those receiving 25 percent may produce normal worker brood for several weeks. The copiousness of insemination resulting from the introduction of the seminal vesicle bodily into the virgin queenbee averages distinctly higher than that previously obtained from injecting free semen, and the farther pursuit of this technique is clearly indicated.

## GENETICS

ALBERT F. BLAKESLEE, Smith College

Grant No. 621 (1942), \$700. Determination of the factors involved in chemical regulation of embryo development in plants with the possibility of their ultimate control.

The grant was used for the support of assistants during the summer of 1943 and contributed materially toward the results reported at the Autumn Meeting of the Society in 1943 in a paper by A. F. Blakeslee and Sophie Satin, entitled "New Hybrids from Incompatible Crosses in *Datura* through Culture of Excised Embryos on Malt Media." An abstract of this paper follows.

To analyse chromosomal changes in evolution of the 10 herbaceous species of *Datura*, hybrids are necessary in which chromosomes may be matched up and compared. Unfortunately hybrids between certain species have not been possible. Fertilization may take place but embryos become arrested at early stages and no viable seeds result. By dissecting out such arrested embryos it is possible in many cases to cultivate them on artificial media with the technique developed by van Overbeek and Marie E. Conklin for normal embryos of *Datura stramonium*. The media used contained the necessary salts, vitamins and an "embryo factor" secured from coconut milk. When embryos are small (diameter under 0.5 mm.), only slight growth, if any, occurs without embryo factor. We find that powdered malt extract can replace embryo factor from coconut milk if sterilized by filtration instead of by heat. With it we have gotten growth of hybrid embryos from seven new species combinations. One aberrant species (*D. ceratocaula*) which had never hybridized with any *Datura* has given hybrids through use of malt media. Arrested embryos from crosses between *D. inoxia* and a tree *Datura* (*D. arborea*) have been brought into cultivation. This suggests the possibility of extending chromosomal analysis to tree *Daturas* which by some are considered genetically distinct from *Datura* and to be included in a separate genus *Brugmansia*.

We have apparently succeeded in getting a new hybrid of *Iris* to develop from an excised embryo and have evidence that the technique described may be of value also in other genera in securing new hybrids which have hitherto been impossible. There are critical periods in differentiation which are differently affected by various chemical regulators. Probably because of interference with

normal regulatory processes, multiple shoots frequently develop from single excised embryos. Malt stimulates shoot differentiation but may inhibit root formation. Roots may be stimulated by reducing malt and vitamins. It should be stated that others have also cultivated hybrid embryos on artificial media. Our contribution to the hybridization problem lies in the use of the "embryo factor" and the technique of van Overbeek and Marie E. Conklin which enable embryos to be excised and cultivated at an earlier stage than heretofore has been possible, and in the use of malt extract as a more convenient source of the embryo factor than coconut milk.

Further study of regulatory factors involved in fertilization and embryo differentiation should lead to a conscious control of a wider range of life processes.

REGINALD RUGGLES GATES, Marine Biological Laboratory

Grant No. 662 (1942), \$390. Preparation of a large work on Human Genetics.

The preparation of a comprehensive work on Human Genetics has occupied most of my time in the last two years. The Library facilities of the Marine Biological Laboratory have been mainly used and have proved very serviceable for all general biological and medical literature. The more specialized medical, neurological, and psychiatric journals have been consulted at the Boston Medical and the Harvard Medical Libraries, and some of the anthropological literature in the Department of Anthropology of Harvard University.

The work is divided into thirty-one chapters with a total of over 500,000 words, 337 illustrations including many pedigrees, and over 4500 references. Many chapters deal with the medical literature regarding the inheritance of abnormalities of the eye, ear, skin, hair, teeth, limbs, skeleton, alimentary canal, blood system, muscular system, sex organs, and nervous system. Introductory chapters are concerned with genetic principles, human cytology, and linkage. Other chapters deal with such topics as eye color and hair color, albinism, allergy, and metabolic defects. The blood groups, hemophilia and congenital anomalies in their genetic aspects are the subjects of other chapters.

Hereditary syndromes, many of which have been described in

the medical literature in recent years, are the subject of another chapter. Chapters on constitution, twinning, and the genetic aspects of cancer also consider these subjects from the biological point of view. A long chapter is devoted to the inheritance of anthropological characters such as head shape, hair form, and skin color, another to stature and size, others to the inheritance of mental defects and normal mental differences.

In connection with the inheritance of innumerable disease conditions, such as diabetes mellitus and goitre, it has been necessary to enter to some extent into the physiology in order to get an understanding of the genetics. The results of embryology, biochemistry, and tissue culture have also been drawn upon when they throw light upon the inheritance of any particular condition. While a complete scientific classification of all these normal and abnormal conditions is impossible, it is hoped that a full index will make all the material readily available. The medical literature relating to the subject is so vast that in most cases only a selection of the more important references is possible.

Many new conclusions and points of view have resulted from the assembly of this large amount of material on the genetics of normal and abnormal human characters. Free use has also been made of animal genetics, especially as regards *Drosophila* and the mammals. Most of the material has not previously appeared in book form.

R. R. HUESTIS, University of Oregon

Grant No. 643 (1942), \$400. Tests for linkage of silver pelage and flexed tail in *Peromyscus* (The American Deer Mouse).

An  $F_2$  population of 1068 individuals, produced by parents heterozygous for silver and flexed tail had contained but one double recessive individual, a male. This mouse and his sons with a similar genotype were mated with  $F_1$  females in the repulsion phase (with the genes on opposite members of a chromosome pair). The test-cross progeny of 107 mice contained 78 percent silver or flexed mice and 22 percent non-silver non-flexed or silver-flexed mice.

Double recessive males mated with  $F_1$  females in the coupling phase (with the genes for silver and flexed on the same chromosome) have produced a test-cross progeny of 211 mice containing 26 percent silver or flexed and 74 percent non-silver non-flexed or

silver-flexed mice. The 22 and 26 percent classes represent the cross over female germ cells, in each experiment, which produced mice that were counted. These percentages are reasonably close to one another considering the number of individuals involved and the competitive interaction of young during intrauterine and lactation periods.

A small test-cross progeny from double recessive females mated with  $F_1$  males in the coupling phase has been accumulated so far. Only 15 percent of 41 mice are in the cross-over classes and 85 percent are non cross-overs. A smaller number of cross-over male than female gametes has been the rule in mammals, in which class the male is the heterogametic sex. These last matings are being continued and tests of repulsion phase males will be made when stock accumulates enough to allow it.

CHARLES W. METZ, University of Pennsylvania

Grant No. 661 (1942), \$1,500. Studies on the effect of irradiation upon the oöcytes of *Sciara*.

In collaboration with Miss Martha L. Bozeman, investigations on the effects of irradiation on chromosomes have been continued. These investigations deal with the differential sensitivity of chromosomes at successive stages of meiosis in maturing oöcytes of *Sciara ocellaris* Comst. Studies on a second strain, a yellow body color mutant, have confirmed and extended the results secured from a wild race formerly tested.

Since oöcytes in *Sciara* mature synchronously, it is possible to treat them in any desired meiotic stage. Sensitivity to irradiation is determined by analysis of aberrations in the salivary gland chromosomes of  $F_1$  larvae. All cell-lethal aberrations are thus eliminated from this analysis. Oöcytes during growth stages have been shown by earlier studies to have a very high resistance to irradiation, no pycnosis occurring immediately after treatment and no aberrations being obtained in salivary gland chromosomes of  $F_1$  larvae.

Sensitivity can first be detected in larvae developing from oöcytes irradiated in late prophase of the first meiotic division. The percentage of slides with aberrations increases from 4 percent in prophase to 50 percent in mid-anaphase. Anaphase movement normally stops at this time and there is a subsequent decrease in

sensitivity in older oöcytes (40 percent affected) which are still in the arrested anaphase condition.

The aberrations were classified as inter-chromosomal and intra-chromosomal. The total number of aberrations analysed was 144; only one was inter-chromosomal, an intercalary translocation. The intra-chromosomal aberrations were divided into chromosome and chromatid aberrations. Chromosome aberrations include inversions, deletions, and transpositions, inversions being most common. Chromosome aberrations form an increasing proportion of all aberrations from prophase where they include 27 percent of the aberrations, to late anaphase where they include 80 percent of all aberrations. Chromatid aberrations, repeats and duplications, consequently, decrease with increasing age. Special efforts are being made to discover the reason for this difference in type of aberrations at different stages. The increase in sensitivity is associated with increased chromosome movement, disappearance of the nuclear membrane, increased coiling of chromosomes and contraction of the chromosome matrix or sheath. But which associations are causal and which are merely coincident with the increase in sensitivity has not yet been ascertained.

H. J. MULLER, Amherst College

Grant No. 660 (1942), \$990. The mechanism of chromosome breakage by irradiation.

An investigation was conducted into the nature of the differences between genetically "inactive" ("inert," "chromocentral," or "heterochromatic") and genetically "active" ("free" or "euchromatic") regions of chromosomes, with especial reference to the question whether the inactive regions contain genes that are themselves less active, or contain fewer genes than the active regions, within a given volume of the chromatin present in mitotic and spermatozoön stages. First consideration here was given to the apparent contradiction between (a) the fact that equal amounts of the two regions, as seen in these stages, are broken with approximately equal frequency by irradiation of spermatozoa, as though they contained approximately equal numbers of genes, and (b) the evidence indicating that by far the greater part of the heterochromatic material visible in a chromosome-arm in these stages exists as one, or at most two, genetically unbreakable "blocks," which are represented in the salivary chromosomes by only one or two minute



bands, and which therefore, at mitosis and in spermatozoa, probably consist of accretions of extraneous chromatin surrounding just one or two individual genes—a situation which would leave very little room for other genes in the heterochromatic regions, but would result in these other genes being approximately as crowded as those in active regions.

For this investigation, two contrasting groups of *D. melanogaster* stocks were made up, in one of which the X-chromosome in mitotic stages was twice the size of that in the other, the difference consisting entirely of heterochromatic material and almost entirely of that portion of the heterochromatin which according to our evidence forms the main block or blocks above mentioned. These differing chromosomes were obtained by the known method of allowing crossing-over between two similar but non-identical inversions, of which one just included and the other just excluded the block. Besides these inversion-crossovers, the stocks were made up so as to contain various other inversions, one other in the X and at least one in each arm of each major autosome, all associated with "marker" genes, in order so to reduce crossing-over in females heterozygous for these inversions as to allow the distribution of nearly all their chromatin among the next generation to be recognizable by means of the markers.

Mature males ( $P_1$ ) with the contrasting X's were irradiated simultaneously with the same dosage of X-rays (ca. 4000r), and shortly afterwards mated to females ( $P_1$ ) having ordinary X's. Large numbers of the daughters ( $F_1$ ) were then bred individually in test-crosses to determine from the distribution of markers among their offspring ( $F_2$ ) the number of cases of translocations of the major chromosomes that had been induced in the spermatozoa of  $P_1$ . The presence of the additional inversions allowed, as above explained, the use of the heterozygous  $F_1$  females for testing, instead of (as in usual techniques) the males. This avoided the great loss of translocations which ordinarily occurs by reason of their recessive sterilizing and lethal position-effects, exerted through the single X on the males. Thus, in the present experiments, the translocation frequencies of the X were found to be about three times as high as ordinarily obtained, a result of significance in other connections.

The frequency of translocations of the larger X was seen to be clearly no larger—in fact, the observed frequency appeared if anything smaller—than that of the X of half its size. As a kind of

control, purely autosomal translocations gave sensibly equal frequencies in the contrasted series.

A confirmation of the above result was obtained in other experiments, where the frequency of minute deletions and other rearrangements of the extreme left end of the X was tested, in stocks in which this left end differed in regard to the presence or absence of the same heterochromatic region as that above studied. Here too the additional chromatin caused no increase in observed breakage.

These experiments fully confirm our previous concept of blocks. They show that the heterochromatin consists of two fundamentally different parts: one (the blocks) which comprises practically all the visible volume of heterochromatin at mitotic stages, and within which breakage occurs far more rarely than in an equal volume (at mitosis) of active regions, if it occurs at all, and another portion, represented by nearly all the visible heterochromatic bands of salivary chromosomes, which is broken far more readily (or is *effectively* broken far oftener, because of rejoining less readily) than is an equal volume (as judged either in salivary or mitotic chromosomes) of an active region. Thus it can be only a coincidence that the heterochromatic region as a whole, when both parts are taken together, shows an average breakability like that of active regions.

In the especially breakable part, there appear, on other evidence, to be some dozen genes, which have some activity, and seem about as crowded as in euchromatic regions, both in mitotic and in salivary stages. Breakage here may occur in very varied positions. That the inordinately high breakability of this portion is inherent, and not somehow induced by an adjacent block (which might conceivably exert a strain, or might transfer the effects of radiation hits it received), is shown by the above finding that the breakability remains after the blocks are removed. Parallel experiments which we have conducted on special Y-chromosomes have given corroboratory evidence of this. In a similar way, the results of the second series of experiments show that the high breakability is not mainly caused by the presence of the centromere. Most of the other special properties of heterochromatin which are seen in salivary preparations are also inherent in this very breakable portion.

As for the blocks, it is evident that their so-called "sensitive volume" (that sensitive to radiation-breakage), as ordinarily calculated, must be far smaller than their visible volume in mitotic stages. This agrees with the inference, otherwise arrived at, that

the material here seen consists almost entirely of an accretion extraneous to the individual gene within, and that this gene must therefore be in a relatively non-spiralized condition at such times. Strictly speaking, the term inert applies only to the extraneous material, and connotes only genetic inertness—lack or dearth of genes. No doubt however the blocks do have some characteristic function. This is a matter that is being investigated in further experiments.

ARTHUR G. STEINBERG, McGill University, Montreal

Grant No. 613 (1942), \$600. Studies on the development of the eye of *Drosophila melanogaster*.

Earlier studies by the author on the Bar eye mutation of *D. melanogaster*, have shown that Bar eye discs are smaller than wild type eye discs at all larval stages of development and that the growth rate of the Bar and wild type eye discs is identical during all stages of larval development. Experiments involving temperature and an inhibitor of Bar yielded data which showed that these two agents affected imaginal facet number without affecting the size of the larval eye discs. On the basis of these observations the following hypothesis was formulated: the reduced size of the Bar eye disc is postulated to be due to the participation of fewer cells in the initial formation of the eye disc; the size of the eye disc determines the range over which the facet number of the eye may vary; variation in facet number once the eye disc is formed is postulated to be due to the presence of cells labilely determined to form head chitin or facets. Experiments were performed to test the applicability of this hypothesis to the development of four other mutants of *D. melanogaster*, namely *Lobe*<sup>2</sup>, *Lobe*<sup>4</sup>, and *Lobe*<sup>5</sup> located at 72.0 in the second chromosome and *eyeless*<sup>2</sup> located in the fourth chromosome. It was found that in the *Lobe* alleles the variation in facet number from fly to fly, as well as between the left and right eyes of the same fly, can be explained on the assumption of the presence of cells labilely determined to form head chitin or facets. In the case of *eyeless*<sup>2</sup> it appears that a portion, if not all, of the variation in facet numbers from fly to fly is caused by variation in the number of cells entering into the formation of the eye discs while the variation in facet number between the left and right eyes of a given fly is due to the presence of cells labilely determined to form head chitin or facets. In conclusion—the hypothesis has been found

adequate to describe the development of these four mutants as well as that of Bar. It may well be that the development of all eye mutants as well as of wild type may be adequately defined by this hypothesis.

STEINBERG, ARTHUR G., 1944. Studies on the Development of the Eye: Evidence that the Lobe<sup>2</sup>, Lobe<sup>1</sup>, Lobe<sup>3</sup> and Eyeless<sup>2</sup> Mutants of *Drosophila Melanogaster* Develop in a Manner Similar to Bar Eye. (In press.)

## BOTANY

CHARLES A. BERGER, Fordham University

Grant No. 656 (1942), \$500. A cytological study of the prophases of meiosis and the prophases of the tetraploid and octoploid somatic cells found in the meristematic regions of the root tips of spinach.

In the course of a comparative study of prophase chromosome behavior at meiosis and polysomatic mitosis in *Spinacia oleracea*, colchicine treatment was tried in the hope of obtaining a third element of comparison. The effects of colchicine on *Spinacia* differed considerably from the effects on *Allium* as described in the literature. Accordingly a series of experiments with *Allium* were made as controls. These experiments confirmed the opinion that there is a real difference in the cytological effects of colchicine treatment in *Spinacia* and in *Allium*. A brief summary of the differences follows.

1. In *Allium* under the influence of colchicine some unorganized spindle substance is produced and takes the form of an achromatic sphere about which the diplo-chromosomes gather at c-metaphase.

2. In *Spinacia* no achromatic sphere of spindle substance is formed and the diplo-chromosomes form dense clumps at c-metaphase.

3. The many strange shapes of restitution nuclei in *Allium* are due to the presence of the achromatic sphere.

4. Restitution nuclei in *Spinacia* are regularly spherical or nearly so.

5. The chromosomes of *Allium* during the reversion phase pass through structural conditions similar to those of normal anaphase and telophase chromosomes.

6. The chromosomes of *Spinacia* during the reversion phase do not resemble anaphase or telophase chromosomes but go through a stage similar to the prochromosome stage of insect spermatogenesis.

BERGER, C. A., AND WITKUS, E. R., 1943. A Cytological Study of C-mitosis in the Polysomatic Plant *Spinacia oleracea*, with Comparative Observations on *Allium cepa*. Bull. Torrey Botanical Club 70: 457-466.

VERNON I. CHEADLE, Rhode Island State College

Grant No. 442 (1940), \$400. Investigations of the vascular system in the Monocotyledoneae.

1. At the time a paper<sup>1</sup> on sieve tubes in the Monocotyledoneae was published, in which the present writer was the senior author, about one hundred twenty species in twenty-two families were available for study. As a result of technical assistance made possible by the grant the sieve tubes in about one hundred additional species (and ten new families) have been tentatively examined. These observations indicate that the general conclusions drawn from the original material need no revision. It appears, therefore, that the data from the additional materials confirm these conclusions: the phylogenetic specialization in structure in the sieve tubes of the metaphloem involved (a) the progressive localization of highly specialized sieve areas on the end walls, (b) a gradual change from very oblique to transversely placed end walls, (c) a gradual change from compound to simple sieve plates, and (d) changes in the sieve areas on the side walls of adjacent sieve-tube members in which such areas have become less and less conspicuous. Furthermore, the occurrence of sieve tubes in various degrees of specialization throughout the organs of the plant follows the observations reported in the original paper. The presence of highly specialized sieve tubes throughout the plant in the Gramineae, Cyperaceae, and Juncaceae has been observed in a large number of species, especially among the first two families.

2. Among investigations of the Gramineae, Cyperaceae, and Juncaceae carried on with Miss Joan Sanders were attempts to test the validity of certain tentative conclusions of other authors with regard to the length of tracheary elements throughout the metaxylem. We have found in these highly specialized families that the cells of the metaxylem which matures first generally are shorter in length than those of the metaxylem which matures last. Due regard must be taken, however, of the part that the degree of

<sup>1</sup> Observations of the phloem in the Monocotyledoneae. 1. The occurrence and phylogenetic specialization in structure of the sieve tubes in the Metaphloem. Amer. Jour. Bot. 28: 623-627 (1941).

phylogenetic specialization of the cells themselves plays in their actual length. For example, if the vessel members in the late metaxylem are highly specialized and those in the early metaxylem are more primitive, then the lengths of such cells in the two areas of the metaxylem are more likely to be similar. The reasons for this are probably two-fold: (*a*) the less highly specialized cells tend to be relatively long (evidence for this statement is presented in papers given in the bibliography), and (*b*) other things being equal, the cells of the early metaxylem appear to be shorter than those of the late metaxylem. The resultant of these two tendencies in the example stated above would be cells of more equal length in the early and late metaxylem. Further work needs to be done among other families where greater differences in specialization, aside from length, occur between cells of the metaxylem which is last to mature and those of the metaxylem which is first to mature. These exploratory observations are significant, nevertheless, because they tend to emphasize that, before final conclusions can be made concerning the influence of ontogenetic factors on certain features of cell structure, the influence of phylogenetic factors on such features must be ascertained. This statement is not meant of course to convey the impression that ontogeny should be disregarded in the accumulation of data for phylogenetic studies. A knowledge of both types of factors, and of the plants in which they can be observed most readily, may ably serve to further efforts in solving both phylogenetic and ontogenetic problems in the Monocotyledoneae.

- CHEADLE, V. I., 1941. Report of Progress. Yr. Bk. Amer. Philos. Soc. for 1940: 140-141.
- 1941 (with WHITFORD, N. B.). Observations of the Phloem in the Monocotyledoneae. I. The Occurrence and Phylogenetic Specialization in Structure of the Sieve Tubes in the Metaphloem. Amer. Jour. Bot. 28: 623-627.
- 1941 (with WHITFORD, N. B.). A Discussion of Some Factors which Influence the Form of the Vascular Bundle in the Monocotyledoneae. (Abstract.) Amer. Jour. Bot. (Suppl.), No. 10.
- 1942. Report of Progress. Yr. Bk. Amer. Philos. Soc. for 1941: 149-152.
- 1942. The Occurrence and Types of Vessels in the Various Organs of the Plant in the Monocotyledoneae. Amer. Jour. Bot. 29: 441-450.
- 1943. Report of Progress. Yr. Bk. Amer. Philos. Soc. for 1942: 156-157.
- 1943. The Origin and Certain Trends of Specialization of the Vessel in the Monocotyledoneae. Amer. Jour. Bot. 30: 11-17.

- 1943. The Specialization of Vessels in the Late Metaxylem of the Various Organs in the Monocotyledoneae. Amer. Jour. Bot. 31: 484-490.

T. H. GOODSPEED, University of California

Grant No. 598 (1941), \$500. Character and distribution of *Nicotiana* and related genera in the Andes.

During 1942-43, areas not previously explored in Peru, Chile, and Argentina were examined for incidence of species of *Nicotiana*. In northeastern Peru, the distribution of *N. Setchellii*, a new species discovered in the Dept. Amazonas in 1937, was found not to be continuous with that of any other member of the tomentosa species group which is otherwise known only from central Peru southward. The new species, *N. Arentsii*, first found in 1938 in southwestern Peru, near the Bolivian border, was again collected and its highly localized Peruvian distribution established. The distribution of *N. Arentsii* in certain areas of northwestern Bolivia is the same as that of *N. wigandioides* and *N. undulata*, the two species whose progenitors have been shown to have entered into its amphidiploid origin. Further exploration of the Peruvian coast, especially south of Dept. Lima to the Chilean frontier, extended the previously known range of distribution of the paniculata species group to include practically the entire coastal area. Further collections of *N. rustica* in isolated regions at middle altitudes on the western slopes of the Andes indicate that it is native in Peru and not an escape from cultivation there.

In northwestern Argentina, confirmation was obtained of an earlier indication that the present day range of distribution of *N. otophora* and *N. sylvestris* overlaps. The significance of this evidence lies in the fact that *N. otophora*, or its progenitors, appears to be the member of the tomentosa species group which, with *N. sylvestris*, was involved in the amphidiploid origin of *N. Tabacum*. Members of the corymbosa species group were previously shown to occur (1) in Patagonia (2) on both the Argentine and Chilean sides of the Bermejo pass at high altitudes and (3) on the western flank of the cordillera to northern Chile. Collections of *N. corymbosa* and related species made in 1942 in the Argentine Andes south of the Bermejo pass from Prov. Mendoza to Prov. Neuquen established a continuity in the distribution of a *Nicotiana* species over a distance of 2000 miles.

Further examination of the flora of the Juan Fernandez islands confirmed previous evidence that *N. cordifolia* does not occur on Mas a Tierra, although it is present on Mas a Fuera. Close morphological and cytogenetic relationships which have been shown to exist between *N. cordifolia* and *Nicotiana* species peculiar to the coast of northern Chile and the coast and highlands of southern Peru bear upon the problem of the origin of the Juan Fernandez group and its floras.

Study of herbarium material and cultures grown from seed collected in the areas referred to above are yielding additional evidence concerning the origin and relationships of present day species of the genus *Nicotiana*.

- GOODSPEED, T. H., 1941. Geographic Distribution of the Chilean Members of the Genus *Nicotiana*. *Revista Universitaria* (Univ. Cat. Chile) 26: No. 2.
- 1941. Cuarta nueva especie de *Nicotiana* en el Peru. *Bol. Mus. Hist. Nat., Univ. Nac. May. de San Marcos* (Lima) 5 (18): 305-313.
- 1942 (with M. V. BRADLEY). Amphidiploidy. *Bot. Rev.* 8: No. 5, 271-316.
- 1942. El tabaco y especies afines. Published separately by the Esc. Nac. de Agric. y Vet. "La Molina," Peru.
- 1942. El tabaco y otras especies del genero *Nicotiana*. *Fac. de Agron. y Vet., Univ. de Buenos Aires*, Bol. 22.
- 1943 (with M. V. BRADLEY). Colchicine-induced Allo- and Autopolyploidy in *Nicotiana*. *Proc. Nat. Acad. Sci.* 29: No. 10, 295-301.
- *Nicotiana Arentsii*—a New, Naturally Occurring Amphidiploid, Species. *Proc. Calif. Acad. Sci.* 25. (In press.)

D. T. MACDOUGAL, Carmel, California, and JEAN DUFRENOY,  
Louisiana State University

Grants No. 429 (1940), \$1,000, and No. 556 (1941), \$300. Study of symbiosis of Monterey pine with fungi.

In the ectendrotropic mycorrhizae of the Monterey pine the fungus forms a felted layer of hyphae surrounding the root. Densely branching hyphae penetrate the soil replacing and amplifying enormously the absorption capacity, normally maintained by root-hairs. Internally the septate hyphae destroy the epidermal and hypodermal cells of the root, traverse the middle lamella of the walls of the cortical cells, and send some branches into the vacuoles of these cells. The only demonstrable material yielded to the fungus by the root is the pectin of the walls, although the position of



the hyphal branches makes other exchanges possible. The independent growth of isolated segments of mycorrhizal roots makes it obvious that through these hyphal branches the root receives from the soil not only the C, N, O, P necessary to build up the nucleus, the cytoplasm and its inclusions (mitochondria and plastids), cell-walls, but also the mineral compounds ordinarily taken in by root-hairs, and growth promoting substances, thiamin, nicotinic acid, etc. The cells of the root which receive this material through the fungus build up carbohydrates, storing the surplus as starch, and proteins in crystals and protoplasts.

An attempt is made to interpret the above symbiosis in terms of cell respiration, whether balanced by the interplay of oxidases and dehydrogenases, or "decompensated," following the dispersion of the dehydrogenases. Decompensated respiration may be due to phosphorus deficiency in the cell in which it occurs.

Phosphorus, as linked up into such molecular structures as pyridine derivatives, nicotinic acid, diphospho-pyridine nucleotide, or in thiamin (vitamine B<sub>1</sub>) may be detected, where it occurs in the tissue, through the formation of molybdenum blue (following treatment of sections in a sulfuric solution of ammonium molybdate, to which has been added amino H sulfonic acid, dissolved in a sodium sulfite, bisulfite solution). Phosphorus as linked up into cytological structures, can be investigated in the same way. A section of excised root of Monterey pine, treated in the molybdenic reagent, shows a definite gradient in the distribution of molybdenum blue, from the meristematic tissues of the tip upwards; meristematic cells are the richest in phosphorus compounds, which become relatively less prevalent as the cell ages and develops large vacuoles. The section shows also a striking contrast between the relative abundance of phosphoric compounds throughout the stele against the scarcity of these in differentiated tissues of the cortex. The stele tissues show a general bluish tinge, the deeper towards the meristematic tissues, the lighter upwards, as contrasted against the cortex tissues, wherein the oxidation of the catechol, dissolved in the vacuolar solution, under the agency of the oxidizing molybdenic reagent, develops a general red color.

Such a section, when studied under the oil immersion objective, will show the minutest details of the correlation between the cytological structure and the distribution of phosphoric compounds. The 24 prochromosomes in the resting nuclei or the 24 chromosomes

in nuclei at various stages of karyokinesis, are clearly differentiated as stained with molybdenum blue; mitochondria and plastids are beautifully outlined, the former as slender blue rods, the latter as more irregular, stout blue bodies, wherein starch grains may be recognized as bluish inclusions. If, following treatment with the molybdenic reagent, the section be now further stained with acid fuchsin, the plastids will retain some of the molybdenum blue while taking some red, and will develop a purple color, while the mitochondria will develop a bright red color; constituting evidence of difference of structure between mitochondria and plastids, resulting probably from mitochondria being coated more noticeably with lipids which are oxidizable into the fatty acids responsible for the uptake of acid fuchsin. The above test, confirms Guilliermond's views as to the significance of both mitochondria and plastids. Plastids in excised roots may afford evidence of their activity by synthesizing and storing starch grains. Plastids so loaded with starch grains are "amyloplasts" homologous to those of green plants wherein starch is condensed from the sugars translocated away from the photosynthetic green parts.

The pericycle and endodermis layers in the root mark the boundary between two contrasted types of tissues; those in the stele rich in phosphorus linkages which may be described as energy-rich, and able to counterbalance the oxidase activity, and those in the cortex, relatively poor in such linkages, and rich in catechol and in catechol oxidase. Fungi, as they penetrate the root in the formation of mycorrhizae, infest only the cortical tissues, and never transgress beyond the endodermis into the stele.

In the case of roots growing while still normally attached to the pine tree, and more obviously so in the case of excised roots, whatever phosphorus and nitrogenous constituents are metabolized, must be obtained from the soil via the mycorrhizal fungus. Excised roots, also must so obtain their carbon, unless they metabolize  $\text{CO}_2$ .

Pyridine is a possible source of nitrogen for soil organisms.

The molecular structures coming into play in the metabolism of either the fungus or root component of the mycorrhiza tissues, may be derived from the soil as the carbon, nitrogen, or phosphorus constituents, or as molecular structures at various degrees of complexity. The hyphae of the mycorrhizal fungi yield molybdenum blue with the molybdenum reagent, suggesting the prevalence of phosphoric complexes, and yield indophenol blue with the quinone

chloromide, the reagent for pyrodoxin. But whether such compounds be synthesized in the fungus from the elementary constituents or from molecular structures has not been ascertained. Hyphae spread between the cells of the pine root cortex, where there is little phosphorus complex playing as dehydrogenases, and where conversely, high oxidase activity can be brought to evidence through microchemical tests. Oxidase activity seems to be higher in the cortex of the pine root (whether previous to mycorrhizal infestation or after) than it is in the stele. Such a difference should play a role in controlling selective permeability: anions, with their negative charge, should be carried from the site of higher activity, to that of the lower. The tissues of the stele, from their meristematic stage, maintain a low oxidase level, by retaining a high level of phosphoric complexes, acting as dehydrogenases. This condition enables them to trap such anions as ( $\text{H}_2\text{PO}_4$ ) or ( $\text{HPO}_4$ ).

Here lies perhaps the essential difference between suffering from parasitism or indulging in symbiosis: in the first case the infected tissues would release their phosphoric anions to the parasite fungus, which is able to maintain a low level of oxidase activity; in the case of mycorrhizal symbiosis, the fungal partner, while infesting the cortical tissues, is never allowed into the stele, wherein there prevails a low level of oxidase and a high level of phosphoric complexes.

That excised roots grow in the soil, in symbiosis with mycorrhizal fungi, demonstrates that the phosphorus, which the stele tissues so successfully utilize in metabolism and growth, is obtained from the soil via the fungus. The mechanism whereby phosphorus piles up in the stele is easily understood, assuming phosphorus to move as anions towards the site of lower oxidase level. Besides that in intranuclear nucleoproteins, such phosphorus as is evident in the old cells of the cortex is there "coacervated" into phospho-lipids, which may be assumed to have a "zwitterion" structure or to carry a positive charge, therefore accumulating at the site of highest oxidase concentration about the coacervates.

From our histochemical investigations on excised roots growing in wooden containers of soil we may conclude as follows:

1. The mycorrhizal fungus, when it grows actively into the tissue, and forms an active partner, gives an intense blue coloration with the molybdenum reagent which is indicative of bound phosphorus, as could occur with thiamin, dissolved in the vacuolar solu-

tion. No such intense reaction for water soluble phosphorus compounds was observed in the tissue of the host, where the phosphorus is mostly linked into nucleoproteins within the nucleus or onto phospholipids, such as constitute or coat mitochondria and chiefly plastids, or again into the phospholipidic membranes around coacervated spherical masses of polyphenol.

2. Reaction with paraphenylenediamine, resulting in the formation of indophenol blue, brings out evidence of high oxidase activity in the ectendotrophic mycorrhizae.

3. Production of indophenol blue with 2-6 dichloroquinone chloro-imide points to pyrodoxin being abundant in the mycorrhizal fungi, chiefly in the outer hyphae, in contact with the soil, and in the "mycorrhizal mantle."

The remobilization of pyridin derivatives, obtained from the soil by the symbiotic fungus and furnished by it to the cells of the root makes possible the growth and continued survival of isolated segments of pine roots.

MACDOUGAL, D. T., AND DUFRENOY, JEAN, 1941. Report of Progress. Yr. Bk. Amer. Philos. Soc. for 1940: 214-217.

—— 1942. Report of Progress. Yr. Bk. Amer. Philos. Soc. for 1941: 161-162.

E. D. MERRILL, Arnold Arboretum, Harvard University

Grant No. 640 (1942), \$500. Intensive study of the large accumulated botanical collections from China, particularly from Kwangtung, Kwangsi, Keichow, and Hainan.

This grant was used for the partial support of Dr. Hui Lin Li, who has devoted his time since November 1942, to a study of our accumulated Chinese collections, and closed his work here at the end of October 1943.

The following papers have been prepared by him:

1. "Studies in the Melastomataceae of China." About 120 typed pages of manuscript including the description of one new genus, and about 25 new species. All previously recorded species of the family for China are accounted for, see *Journal*, Arnold Arboretum, 25: 1-42 (1944).

2. "Notes on the flora of southern China." Thirty typed pages of manuscript, includes the descriptions of 10 new species and records regarding others.

3. "Notes on the flora of southwestern China." About 80 typed pages of manuscript with descriptions of 18 new species and notes on others.

4. "Additions to our knowledge of the flora of Hainan." Twenty-five typed pages of manuscript, including 12 new species with notes on others.

5. "New Kwangsi plants." Twenty typed pages of manuscript, consisting of the description of 12 new species with notes on others.

6. "Further notes on the flora of Indo-China." Nine typed pages of manuscript. Two new species described with notes on others. All of these papers, after editing, will be published in the *Journal of the Arnold Arboretum*.

WENDELL R. MULLISON, Purdue University

Grant No. 623 (1942), \$350. Some effects of oxidized nitrogen versus reduced nitrogen on calcium metabolism in tomato plants.

Young tomato plants deficient in calcium grown in sand or gravel culture were supplied nitrogen in the form of nitrate salts, which are oxidized forms; other plants were supplied the nitrogen in the form of ammonium salts and urea, which are reduced forms. The two types of nitrogen brought about very different growth responses in the calcium deficient plants. The ones supplied with nitrate nitrogen showed calcium deficiency symptoms very quickly, one of the most marked being the dying of the growing point. When urea was the nitrogen source the Ca deficiency symptoms occurred at a much later date and were not as severe. The plants given urea minus calcium solution also grew and synthesized much more dry material than the ones given a nitrate minus calcium diet, frequently being about twice as tall and weighing more than twice as much. Other nitrogen compounds with reduced nitrogen were tried as nitrogen sources including guanidine sulphate and ammonium sulphate but urea proved to be the most satisfactory. Some investigations concerning the types and varying amounts of nitrogenous plant compounds present in plants grown under such conditions are being made with the hope of being able to explain the above growth differences.

MULLISON, W. R. Some Recent Experiments in Plant Nutrition. Bot. Gaz. (In press.)

JOHN ERNST WEAVER, University of Nebraska

Grants No. 283 (1938), \$450; No. 380 (1939), \$600; No. 489 (1940), \$600; No. 596 (1941), \$300, and No. 674 (1942), \$600. Nature and rate of recovery of midwestern grasslands from the great drought.

Two or three years after the end of the great drought (1934-40) a number of definite grassland communities or types had crystallized out of the much depleted, weedy, and greatly mixed vegetation of drought-stricken true prairie. Two of these, the very xeric western wheat grass (*Agropyron smithii*) and wheat grass with an understory of blue grama (*Bouteloua gracilis*), had completed their development by 1940. The short grass formed another type which also became definitely established during or immediately following the drought. These three kinds of grasslands, of small extent before the drought, now occupy about half of the re-established prairie. Needle grass (*Stipa spartea*), prairie dropseed (*Sporobolus heterolepis*), and big bluestem (*Andropogon furcatus*) each control definite communities of wide extent. The remainder consists of the relict little bluestem (*Andropogon scoparius*) and big bluestem type, and (a small portion) of mixed prairie grasses with still little expression of dominance. The present mosaic cover of types is not climax but only that stage in recovery has been reached where the occupation of all or practically all of the territory has neared completion.

Since replacement of vegetation is nearly complete, it has been possible to evaluate the importance of the several groups of species in the process of recovery. Certain native forbs—*Aster multiflorus*, *Erigeron ramosus* and others—had a tremendously important role. The subere of ruderals, both forbs and grasses, has been ascertained. The important part in recovery performed by June grass (*Koeleria cristata*), side-oats grama (*Bouteloua curtipendula*) and other grasses than those which formed types has been ascertained. Formerly occurring in small amounts they increased enormously, held the bared soil against erosion by wind and water, and furnished protection for seedling grasses. With the return in force of the dominant grasses, they are now being relegated to their former place as interstitials.

Methods of recovery consisted of regeneration from rhizomes which had lain dormant for several years (big bluestem, Indian grass, etc.); growth from dormant crowns of both grasses and forbs

(little bluestem and prairie dropseed, buffalo bean, false indigo, and many others); germination and growth of seedlings from seed remaining dormant in the soil five to nine years; and by rapid increase in size of seedlings or recovered relicts by tillering and production of rhizomes or stolons. A great increase of foliage development, often in unusually large amounts, followed the return of abundant soil moisture. The cover has thickened greatly year by year. This is shown by large increases in yield. Production of dry matter in 1941 was 1.6 times as great as that in 1940, and production in 1943 was 2.3 times that of 1941.

In the short-grass type in mixed prairie both great recovery and a marked change in the kind of vegetation has occurred. In collaboration with Dr. F. W. Albertson, it has been found that newly replaced short-grass vegetation consisted of sixty percent blue grama and thirty-five percent buffalo grass (*Buchloe dactyloides*) in 1940. But in 1943 it was composed of one-third blue grama and two-thirds of the rapidly spreading, stoloniferous buffalo grass.

Recovery of mixed prairie began in 1940, it was greatly accelerated in 1941-42, but declined in response to decreased soil moisture in 1943. At Hays, Kansas, for example, yields of short grasses in 1940 to 1943 inclusive were 538, 890, 1,650, and 672 pounds per acre. Degree of recovery of mixed prairie increased rather directly with distance as one traveled from the dry dust-bowl area in southwestern Kansas either northward or northeastward. Final reports on recovery during the three years since drought are either in press or being completed.

- WEAVER, J. E., 1940-42. Reports of Progress. Yr. Bk. Amer. Philos. Soc. for 1939: 303-305; for 1940: 269-271; for 1941: 165-168; for 1942: 159-162.
- 1940 (with ALBERTSON, F. W.). Deterioration of Grassland from Stability to Denudation with Decrease in Soil Moisture. Bot. Gaz. 101: 598-624.
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- 1942. Competition of Western Wheat Grass with Relict Vegetation of Prairie. Amer. Jour. Bot. 29: 366-372.
- 1942 (with ALBERTSON, F. W.). History of the Native Vegetation of Western Kansas during Seven Years of Continuous Drought. Ecological Mono. 12: 23-51.

- 1942 (with MUELLER, I. M.). Role of Seedlings in Recovery of Mid-western Ranges from Drought. *Ecology* 23: 275-294.
- 1943 (with ALBERTSON, F. W.). Resurvey of Grasses, Forbs, and Underground Plant Parts at the End of the Great Drought. *Ecological Mono.* 13: 63-117.
- 1943. Replacement of True Prairie by Mixed Prairie in Eastern Nebraska and Kansas. *Ecology* 24: 421-434.
- 1944 (with ALBERTSON, F. W.). Effects of Drought, Dust, and Intensity of Grazing on Cover and Yield of Short-Grass Pastures. *Ecological Mono.* 14. (In press.)
- 1944. Recovery of Midwestern Prairies from Drought. *Proc. Amer. Philos. Soc.* (In press.)

EDGAR T. WHERRY, University of Pennsylvania

Grant No. 403 (1940), \$500. Preparation of a monograph on the genus *Phlox*.

In continuation of this project, three articles on *Phlox* have been published during the year. One new species was described from Utah and one new subspecies from Florida.

WHERRY, EDGAR T., 1943. Report of Progress. *Amer. Philos. Soc. Yr. Bk.* for 1942: 162.

- 1943. Variation in *Phlox floridana*. *Bartonia* 22: 1-2, 1 pl.
- 1943. *Phlox amoena*. *Bull. Amer. Rock Gard. Soc.* 1: 59-62, 1 pl.
- 1943. *Microsteris*, *Phlox*, and an Intermediate. *Brittonia* 5: 60-63, 1 pl.

#### ANTHROPOLOGY

WALTER W. TAYLOR, JR., Harvard Medical School, AND  
WILLIAM C. BOYD, Boston University  
School of Medicine

Grant No. 648 (1942), \$200. Blood groups of the pre-historic Indians of Coahuila by serological tests of their mummified remains.

Observations were made on the blood group reactions of sixteen specimens of the American Indian mummies from Coahuila, Mexico. Four of these specimens consisted of bone only and were not tested. The results obtained to date with the remaining twelve are summarized in the accompanying Table I. The technic used has been described by one of us in previous publications.<sup>1, 2</sup> Briefly it con-

<sup>1</sup> Boyd, W. C., and Boyd, L. G. Blood grouping tests on 300 mummies. *Jour. of Immunol.* 32: 4 (1937).

<sup>2</sup> Schiff, F., and Boyd, W. C. Blood grouping technic. Interscience Publishers, Inc., N. Y. (1942).



sisted of testing whether the samples when finely ground and mixed with anti-A and anti-B iso-agglutinins possessed the power of combining with and removing one or both of these agglutinins. The way in which these results enabled a decision to be made about the blood group is indicated in Table II.

TABLE I  
PRELIMINARY REPORT ON BLOOD GROUPING TESTS OF  
COAHUILA MUMMIFIED MATERIAL

Group O	Group A	Group B	In process
C 59b-B1 C 68 -B3 C 24 -B13 C 79 -B1 C 24 -B-H C 74 -B1 Cojote Cave "Mummy" USNMacc 9462 Cat. 45581	Coyoto Cave 22776	C 68 -B18 C 54b-B1	C 68 -B19 C 58c-B1

TABLE II

Agglutinin removed	Blood group of tissue
Neither.....	O
Anti-A.....	A
Anti-B.....	B
Both.....	AB

We introduced the check of using both human and immune sera for each test, as the finding that a tissue having the power of removing the anti-A agglutinin from human type B serum had also the power of removing anti-A from an immune rabbit serum greatly strengthened confidence in the specificity of the reaction.

*Reagents.* Human sera of types A and B were prepared in the usual way. Not all sera were found to have high enough titers. The B serum was diluted to make it of equal strength with the A. The A and B sera were not usually mixed for the test, on account of the possibility of some neutralization of the agglutinins by A and B substances normally occurring in the sera themselves. Type O serum was not used because of the commonly unequal strength of its agglutinins, and the possibility that the removal of one ag-

glutinin from an O serum may in some cases involve some removal of the other.

Immune sera, anti-A and anti-B, were prepared by injecting rabbits as previously described,<sup>2</sup> absorbed with B or A erythrocytes respectively, titrated, and diluted to the desired strength.

*Procedure.* Our final procedure in examining a specimen of mummified tissue was as follows: The material was ground in a mortar, and about 0.08 gram of it treated in a small test tube with human sera of groups A and B, and a mixture of anti-A and anti-B sera in volumes of 0.4 ml.; the sera having a titer of between 1:8 and 1:32. After the usual mixing and 48 hours standing, the supernatants were removed and titrated, using 0.1 ml. pipettes to make the progressively doubled dilutions. Final decision as to the group of the mummy was based on the amount of agglutinin removed, as judged from the titer before and after absorption. The serum was checked from time to time for changes in strength. It was found that most mummies either reduced the titer one tube, or did not affect it at all, but some specimens reduced it by several tubes. If the titer of a serum was reduced three tubes or more, under these conditions, it was considered presumptive evidence of the presence of the appropriate agglutininogen in the mummified tissue. If the human and immune sera behaved alike in this respect, as they usually did, the mummy was classified as A or B, as the case might be.

The results reported in Table I are to be regarded as tentative only as some retests still remain to be made since the experiments were interrupted by war work on the part of one of us, but the work is practically completed. If results shown here are confirmed, the results will be of considerable significance. Suggesting that the Coahuila culture represented an ethnic group not identical with all the modern inhabitants of the American Southwest<sup>1</sup> and judging by their blood groups possibly allied to the Big Bend Basket-maker culture or possibly to certain early South American Groups.<sup>2</sup>

<sup>1</sup> Boyd, W. C. Blood groups of American Indians. *Amer. Jour. Phys. Anthropol.* 25: 2 (1939).

<sup>2</sup> Boyd, W. C. Blood groups of the South American Indians in handbook of South American Indians. (In press.)

## PSYCHOLOGY

FLOYD H. ALLPORT, Maxwell Graduate School of Citizenship and  
Public Affairs, Syracuse University

Grant No. 666 (1942), \$200. Studies of the influence of war-news headlines upon civilian morale: a contribution to war-effort research and the social psychology of news-presentation.

The studies here reported were carried out in collaboration with Milton Lepkin, Eleanor Cahen, Pearl Waxman, Raymond Rhine, and other members of the Morale Seminar at Syracuse University.<sup>1</sup>

I. THE EFFECT OF SITUATIONAL ASPECTS OF THE NEWS, AS  
PRESENTED IN HEADLINES, UPON THE READER'S MORALE

Three main questions were investigated in this part of the research: (1) Which are more effective for motivating citizens to participate in the war effort—headlines telling of "bad news," or headlines presenting "good news"? (2) If headlines are subdivided into categories on the basis of the side or country doing the action (United States, Allies, or the enemy) and on the basis of the nature of the action itself (winning, losing, or holding), what combinations of actor and action raise the motivation of the reader to the highest level, and what combinations are low in this respect? (3) Does actual newspaper practice show a regard for morale value in the types of headlines published?

One hundred and twenty-six main war-news headlines, of representative character, were employed. They covered the latter half of 1942, and most of them were taken from twelve daily newspapers of large circulation, representing different parts of the country. These headlines were printed on cards closely resembling the upper half of the front page of a newspaper. The banner-head of a Syracuse daily newspaper was employed on each, and below the headline was printed "filler" news-material which remained constant for all cards and was ignored by the subjects in giving their reactions to the headline.

The headline cards were displayed, one at a time, on an easel in the front of the room, and the subjects reacted to each by checking

<sup>1</sup> This report is drawn largely from dissertations submitted by Milton Lepkin and Eleanor Cahen for the degree of Master of Arts at Syracuse University in 1943 and 1944. Mr. Lepkin's dissertation is now on file in the library of Syracuse University.

a "morale-scale" ranging from X (zero), at the left end, to 10 at the right end. A check at X meant that the headline did not make the reader feel like taking a more active part in the war effort than he was already taking. A check at 10 meant that the headline made him feel like taking the most active part that he possibly could. The mean checking of all the subjects for a particular headline was taken as the "morale value" of that headline. Since all the mean checkings were above five, it is considered that the distance of the checking above 5, rather than above zero, is the best differential measure for any given type of headline. This subjective scale method of testing a headline does not, of course, measure its *absolute* morale value. That is, it does not tell us what the subject would actually do toward war-effort participation as a result of reading the headline, but only what he says he would do. The method does, however, enable us to determine the *relative* morale value of different headline categories; and this is sufficient for the purpose in view. The subjects were 109 "average" American citizens. They took part in the experiment in groups of convenient size.

For purposes of determining the effect of "good," *versus* "bad," news a separate group of twenty-five judges rated each headline on a seven-step scale ranging from 3 at the left end (representing "very bad news"), through zero ("indifferent news"), to 3 at the right extreme (representing "very good news"). By the aid of these judgments the mean morale value of the "good" and the "bad" news headlines, as given by the morale-scale checkings of the 109 subjects previously mentioned, were separately computed; and a curve was plotted showing the relationship of morale value to the goodness or badness of the news.

The results may be summarized as follows:

1. Although all war-news headlines increase the reader's desire to take a more active part in the war effort, there are marked differences between headlines in the degree to which this result is accomplished.
2. Bad news headlines evoke a definitely higher morale reaction than good news headlines. Morale value for bad news is 7.23; for good news, 6.20.
3. The curve showing by its height the morale value accompanying various degrees of goodness or badness of the news is highest at

the point of "very bad news" (extreme left). From there on it steadily declines (showing lessening morale) as the news becomes better, until a point near "very good news" is reached. From that point the curve ascends slightly. At no point, however, is the mean morale value of any group of good news headlines as high as that of the lowest group of bad news headlines.

4. A survey of twelve representative newspapers for the period of the experiment, shows that, in terms of the relative morale values of good and bad news-headlines, these newspapers were falling short of their opportunities to foster morale by publishing 42 percent too many good news headlines and 42 percent too few bad news headlines.

5. The ranking of the morale values of the various "actor-action" categories was as follows (beginning with the category having the highest morale value): U. S. Losing (7.61), Allies Losing (7.22), Enemy Gaining (7.22), Enemy Holding (6.85), U. S. Gaining (6.48), U. S. Holding (6.18), Allies Gaining (6.18), Allies Holding (6.18), Enemy Losing (5.92). It will be seen that the first four of these headline categories represent bad news, while the last five represent good news.

6. In a newspaper survey (see 4 above) it was found that the newspapers studied were publishing *too few* headlines of the categories represented by the first portion of the above list, and *too many* for the latter portion, by proportions deviating from an effective morale requirement by 9 to 16 percent in the various categories.

7. The difference between the sexes in the morale reaction to war-news headlines in general is negligible.

8. Translating "active voice" headlines into an accurately corresponding passive voice form produces no reliable difference in their morale values.

## II. EMOTIONS AROUSED BY WAR-NEWS HEADLINES: THEIR ROLE IN RAISING THE READER'S MORALE

The hypothesis is suggested that the motivation to participate in the war effort aroused by war-news headlines may be due to the emotional energies these headlines evoke. A study was made of the emotion-arousing value of the headlines used in the preceding experiment; and the morale values of headlines evoking particular emotions were determined from the data of that investigation.

Thirty-eight "average" citizens reacted to each of the headlines by checking, on a five step scale, the degree of a particular emotion which they felt upon reading the headline. In rating each headline a number of emotions were used, and a separate scale was provided for each. The following conclusions were drawn from this experiment:

1. The only emotions aroused in a significant degree by the headlines employed were as follows: for good news, *pride* and *confidence*; for bad news, *anger* and *fear*; and for both good and bad news, the feeling or attitude of *determination*.

2. When subjects express on a scale the degree of the emotions aroused in them by war-news headlines, they give the "good news" emotions of pride and confidence a stronger rating than the "bad news" emotions of anger and fear. Anger aroused by headlines is felt as stronger than fear. It is likely, however, that these ratings do not express the actual energizing values of these emotions (see conclusion 5 below).

3. The hypothesis that the morale strength of a headline is associated with its emotion-arousing value is confirmed by the fact that headlines of higher emotional value have a higher mean morale value than those of lower emotional significance. This finding holds for all the emotions. The correlation between emotional value and morale value for pride is highest, that for anger next, while the correlation for confidence is lowest.

4. Taking some of the categories separately, when the enemy is the agent and is pictured as gaining, the correlation between *anger* and morale value is high; when the United States is the agent and is portrayed as losing, the correlation between anger and morale is not significant. The reverse is true for the emotion of *fear*: it correlates highly with morale when the United States is depicted as losing, and is not significantly correlated when the enemy is represented as gaining. Anger directed toward the *enemy*, and fear resulting from the contemplation of *our own* reverses, are thus seen to be the orientations which make these emotions instrumental for morale. *Pride* correlates most highly with morale when the United States is represented as gaining, and insignificantly when the enemy is pictured as losing. *Confidence* and morale are significantly correlated only when the *Allies* are depicted as gaining. Confidence in the *united*, rather than the single, effort is necessary if this emotion is to become an adjunct to morale.

5. Turning to the important question of what particular emotions are associated with the *highest* morale, it was found, by taking the means of "pure cases" (that is, those in which the headline did not significantly evoke more than one emotion), that *anger* headlines were the strongest in morale value. *Fear* headlines were next in morale strength, *pride* headlines were next, while those evoking *confidence* were the lowest.

The following reasoning will clarify the relationship of the emotional energies to morale. We have previously seen that the bad news headlines, depicting situations in which the United States or the Allies are losing or the enemy gaining, are the class which have the higher morale value. We have now seen that anger and fear are the *emotions* which, when studied without reference to the type of situation, have the higher morale values; that is, the headlines specifically arousing them have higher morale values than the headlines arousing other emotions. Now if we ask in what situations these emotions (anger and fear) are aroused, we find that they are almost exclusively the *bad* news situations (though of course not *all* the bad news situations arouse significant fear or anger). And what is even more significant, the results show that in proportion as the news gets *worse* (heavier losses for us or greater gains for the enemy), the anger or the fear aroused by the headline increases. Similarly, good news situations (enemy losing, our side gaining) are the lowest categories with respect to the morale value; and the emotions of pride and confidence, occurring in these good news situations, are found, when studied in their own right, to accompany a lower morale value in the associated headlines. The fact that all the emotions are *correlated with* morale value establishes the connection between emotion and morale at whatever level these two variables are considered. These findings strongly suggest that the morale values of the headline categories are dependent upon the emotions which they arouse. It is the stronger energies of *anger* and *fear* which are responsible for the greater heightening of the morale produced by reading bad news headlines; while the weaker emotions of *pride* and *confidence* produce only the lesser morale increases which occur in reading the good news headlines.

### III. "PERSONALIZATION" *versus* "ENTITY" AS MORALE-BUILDERS

In the final portion of the study an attempt was made to discover the morale value which results from stating the actor, or sub-

ject, of the headline as an abstract, collective, national entity, as compared with the value of its statement in more personal terms, that is, in language connoting individuals. For example, does the entity headline "U. S. Hits Nazis First Bombing Blow" evoke a higher, or a lower, war-effort reaction than the personalized headline "We Hit Nazis First Bombing Blow?" Is the headline "Germany Renews Attack on Southern England" stronger or weaker than the headline "Germans Renew Attack on Southern England"? In headlines in which "our side" is the agent newspapers almost invariably employ the entity form. Are they justified in so doing from the standpoint of morale, or are they merely following a traditional usage unrelated to the morale problem?

For this experiment 210 headline cards (consisting of 105 P-E pairs) were prepared, similar in general appearance to those described in Section I. For each "entity" headline there was a direct "personalized" translation. Eight categories were employed, representing our side and the enemy on the offensive and on the defensive, and including a variety of P-E comparisons, such as "We" vs. "U. S.," "Our" vs. "U. S.," "Americans" vs. "U. S.," "Germans" vs. "Germany," and "Japanese" vs. "Japan." In presenting the cards they were thoroughly mixed, so that no personalized form of a headline closely followed or preceded its entity form. Forty-seven typical American citizens served as subjects, and the procedure was similar to that employed in the first experiment. The results and conclusions are as follows:

1. In nearly all categories the mean morale value of the personalized form was not different from that of the entity form. The term "Germans," for example, had the same morale value as the term "Germany," "Americans" had the same value as "U. S.," "We" the same as "U. S."

2. In the case of at least 26 individual headlines, however, scattered through various categories, the personalized and entity forms differed significantly in their morale values. In 9 of these cases the personalized statement was stronger, and in 17 the entity statement.

3. For one category as a whole there was a true mean difference between personalized and entity forms. In headlines representing *our side on the offensive*, the entity term "U. S." was reliably stronger than the personalized term "Our." For example, "U. S.



Bombers Batter Kiska" had a higher morale value than "Our Bombers Batter Kiska."

4. A study of a portion of the 210 headline pairs by the emotion-rating technique (Section II) showed that in two categories there was a probable difference in emotional value between the personalized and the entity forms; and the difference again was in favor of the entity. When *our side* was represented as on the *offensive*, the entity word "U. S." aroused a higher degree of *confidence* than the personalized word "Our." When our side was represented on the *defensive*, the entity "U. S." aroused a higher degree of *anger* than the personalized "We."

5. The findings in 2, 3, and 4 above, giving greater emphasis to the morale and emotional values of the *entity* headlines, may be hypothetically explained by two considerations. First, most of the content of war-news headlines seems to deal with actions too great, too impersonal, and too organized to render such terms as "we," "our," and "Americans" appropriate. The roles of individuals in the national and military organization are not vividly connoted; they remain submerged and obscure. The national entity term seems more appropriate for such great collective actions, and tends, therefore, to be stronger. Second, traditional news-reporting, diplomatic, and educational practice have been based upon collective-entity terminology. Citizens have been trained to think and feel in terms of these larger group stereotypes, rather than in terms of what *individuals* are doing.

6. Through supplementary experiments further light was thrown upon the above problem. It was found that when the two forms of the headline (*P* and *E*) are presented simultaneously side by side (instead of discretely in a mixed series) and the reaction evoked by each is allowed to influence the other, the superiority of the entity term in respect to morale value disappears. The *personalized* form now tends to arouse in the subjects a relatively stronger desire to take part in the war effort. It is suggested that this "proximal" method of presentation may help to bring out more clearly the realization that national or collective action is in reality the combined actions of individuals ("we," "our soldiers," "Americans," etc.). When seen against (or within) the milieu of collective organization, the role of individuals no longer seems insignificant or obscure. The nation is ourselves in action. The abstract stereo-

types employed in diplomatic parlance and in traditional teaching in the social sciences may thus be broken down and stripped of their heavier emotional loading. A principle for the development of a procedure to be used for training in realistic thinking is suggested by these experiments.

ALLPORT, FLOYD H., 1943 (with LEPKIN, MILTON). Building War Morale with News-Headlines. *Public Opinion Quarterly* VII 2: 211-221.

—— 1943 (with LEPKIN, MILTON, AND CAHEN, ELEANOR). Headlines on Allied Losses are Better Morale-Builders. *Editor and Publisher* LXXVI 41: 11 and 48.

BEN KING HARNED AND HUGHBERT C. HAMILTON, Woman's Medical College of Pennsylvania and Temple University

Grant No. 567 (1940), \$500. The effect of the administration of sodium bromide to pregnant rats on the learning ability of the offspring.

The purpose of this investigation was to study in rats the effects of bromides on the developing nervous system. Deviations from the normal were measured by standard psychological tests after all abnormal bromide had been removed from the animals. All of the rats belonged to the Wistar experimental strain and were closely related.

*Methods.* The following procedure was rigidly observed.

1. Sodium bromide was administered by stomach tube to pregnant rats from the 3rd through the 20th day of gestation. The daily doses per kilogram of body weight were: group II, 40 mgm., group III, 80 mgm., group IV, 120 mgm. Group I-C, the controls, received no bromide. With this exception the routine for these animals was identical with that for the bromide-groups.

2. The rats on which the tests for functional damage were made were born approximately two days after their mothers had received the final dose of the drug. After birth, the young rats received no bromide except that obtained from the milk of their mothers. All were weaned at 20 days of age.

3. The drinking water of these animals was replaced by sodium chloride in a 0.2 percent solution from age 20 through 34 days, and in a 0.5 percent solution from age 35 through 41 days. The urine was collected on the 42nd day for bromide determinations. At 43 days of age the rats were delivered to the laboratory of psychology

in order that they might become adjusted during the following two weeks to their new environment and attendants.

4. From age 57-60 days the rats were prepared for learning tests in the maze.

5. From age 61-85 days each animal was given two trials per day in a five cul-de-sac U-maze.

6. The animals were rested for an average of 2 weeks after finishing the maze.

7. The next 6 days were devoted to preliminary explorations on the 3-table apparatus. At this time the age of the rats was approximately 101-106 days.

8. Immediately after the preliminary explorations, the 3-table test, which consisted of daily runs for the next 18 days, was applied.

*Bromide Concentration.* One noticed that the pregnant bromide-rats of groups III-80 and IV-120 offered less resistance to the passage of the stomach tube than did the normal rats but when they were observed in their cages the animals did not appear depressed. A new-born rat from each of the bromide and control litters was dried and analyzed for bromine. The bromine content of group "40" was 10.9 times that of the control; of group "80," 21 times that of the control; and of group "120," 39.7 times that of the control. Analyses of the urines taken at 42 days of age showed a normal bromine content for each group. Bloods taken at 60 days of age from sacrificed animals, representative of each of the experimental groups, gave normal values for serum bromide. The Brodie-Friedman method (1) was used in all determinations. The chemical analyses present convincing data that the rats, subjected to the psychological tests, had normal values for serum bromide.

*The Experimental Groups.* The controls, group "C," consisted of 13 females and 17 males and were obtained from mothers who had received no bromide. Group "40" consisted of 13 females and 20 males, group "80" of 12 females and 18 males, and group "120" of 18 females and 16 males.

*Results of Maze Learning.* The criterion of errors shows a positive relationship between the number of errors and the strength of the bromide-dosage. Group "120" made a significantly greater number of errors than each of the other groups. The performance of group "80" is probably reliably worse than that of the control

group. The other differences are not significant. The criterion of time shows that group "120" is significantly slower than each of the other groups but the other groups do not differ reliably among themselves. The error and time curves show that all groups reached essentially the same level of performance before the 50th trial, suggesting that the deleterious effects of the bromide appear in this test in the rate of learning rather than in the performance finally attained.

The standard deviations of the groups, computed on errors, show, in general, an increase with increasing dosage. Group "120" is significantly more variable than each of the other groups, and group "40" is significantly more so than the control group. The standard deviations computed on the time scores show the same relationships as those for error scores, moreover, all groups differ significantly from one another, with the exception of the "80" and the "40." Reliability coefficients computed by the split-half method (odd-even days) are high, three of the four being higher than those usually reported for mazes.

*Results of the 3-Table Test.* Using the percentage of animals "passing" the test as the criterion, the control group did much better than the bromide groups. The chances in 100 of a true difference are high enough to indicate probable significance but the bromide groups do not differ significantly among themselves. On the basis of error scores, the control group is significantly better than each of the bromide groups but the latter show no differences among themselves. The criterion of time shows a positive relationship between the magnitude of the score and the strength of the dosage. When tested for significance the differences between the control and "120," and control and "80" are reliable but this is not true for the difference between the control and the "40" group. The standard deviations of the groups, computed on both the error and time scores show that the control group is less variable than the bromide-groups. For both criteria the differences between the control and each of the bromide-groups are significant but the bromide-groups do not differ reliably among themselves.

BRODIE, B. B., 1938 (with FRIEDMAN, M. M.). The Determination of Bromides in Tissues and Biological Fluids. *Jour. Biol. Chem.* 124: 511-518.

## PHYSIOLOGY

DETLEV W. BRONK, Eldridge Reeves Johnson Foundation for  
Medical Physics, University of Pennsylvania

Grant No. 48—Johnson Fund (1942), \$3,100. A study of the oxygen supply and oxygen utilization of the brain and of the peripheral nervous system with special reference to the oxygen requirements for maintaining the resting and the active structure of nerve cells.

A method has been developed for measuring the oxygen tension in living tissues and especially in the central nervous system. This is done by means of a metallic electrode applied to the surface of the cortex or placed in a small container surrounding an excised nerve. The oxygen is then measured by recording the current flowing through the electrode when a potential is applied across its surface.

When a large electrode is applied to the surface of the cerebral cortex, it is possible to measure only average oxygen tension in the region where it is placed. Accordingly, an extensive program of development has been undertaken which has finally enabled us to construct small electrodes 25 microns in diameter. With these we have been able to measure oxygen in various restricted areas of the pial surface, because of the small size of the tips of the electrodes, with the aid of a microscope in any desired relation to arterioles, venules, and capillaries. When an electrode is pressed firmly against an arteriole, the oxygen tension measured is found to be that of systemic arterial blood. Similarly, by placing the electrode against a venule the tension in the blood draining part of the cortex can be measured. Thus, with no important interference with the circulation it has been found possible to measure the concentration of oxygen in the blood entering a living and circumscribed portion of the cortex.

When the electrode is placed in contact with an area containing only capillaries (free from arterioles or venules) a relatively low value of five to fifteen mm. Hg oxygen tension has been recorded. Near arterioles and venules the values are considerably higher. The concentration of oxygen in capillary regions is a better index of the oxygen tension near nerve cells than either the venous or arteriolar values. It must be emphasized, however, that the oxygen tension of the cerebral cortex is extremely variable from point to point. This has been well illustrated in a series of experiments in

which the oxygen tension has been accurately mapped as the microscopic electrode has been moved in fifty micron steps away from a minute arteriole. The advantage of such a method for studying the oxygen tension in regions associated with different functions will be obvious.

The oxygen tension is also variable at any one point dependent upon the conditions of blood flow. This has been demonstrated by experiments in which the arterial oxygen tension has been maintained constant, but the flow altered by the injection of adrenalin. In these experiments the oxygen tension in the cortex was found to increase as much as two-fold, the magnitude of change depending on the rise in blood pressure.

The oxygen tensions of the cortex we have obtained are much lower than were anticipated from indirect evidence. This introduces a new conception of oxygen supply and utilization in the cortex. It seems reasonable to attribute these low values to the avid consumption of oxygen by the brain cells. Inasmuch as it has been necessary to make the experiments under the influence of anesthesia, it becomes particularly important to determine the effect of the anesthetic on the oxygen tension. This we have done by making measurements in the cortex under varying degrees of anesthesia. Increasing the depth of anesthesia causes a rise in the oxygen tension, provided the depth of anesthesia is not so great as to suppress the flow of blood to the region.

In the earlier experiments the electrode was applied to the exposed cortex. Such a procedure was unsatisfactory for making precise measurements of oxygen tension inasmuch as there was the possibility of gaseous exchange with the surrounding atmosphere. We have accordingly devised an electrode which is built into a glass window which completely encloses the trephine opening. The results which are quoted in this report have all been made under these conditions which insure that there is no diffusion of oxygen to the cortex from the air.

Another improvement made in the experimental technique during this year has been the development of an electrode which is extremely flexible and which, therefore, moves freely with the cortex as it pulsates under the influence of arterial pressure. This electrode is indeed so light that it exerts less pressure on even a capillary than the pressure within the vessel. This electrode eliminates the danger of obstructing the normal flow to the cortical region

under observation, and also insures that there is no appreciable movement of the electrode relative to a given point.

Measurements are now being made on the influence of variations in inspired oxygen concentration on the oxygen tension in the cortex. This is of timely importance because of the effect of high altitudes on the performance of military aviators.

DAVIES, PHILIP W., 1942 (with BRINK, FRANK, JR.). Microelectrodes for Measuring Local Oxygen Tension in Animal Tissues. *Rev. Sci. Instrum.* 13: 524-533.

JAMES HAIN LEATHEM, Rutgers University

Grant No. 639 (1942), \$400. Studies on the influence of gonadotropic and androgenic hormones on the reproductive organs of normal and hypophysectomized rats and of normal mice.

The influence of testosterone propionate on the adrenals and testes of the hypophysectomized immature male rat was studied. A partial maintenance of adrenal weight can be obtained for at least fifteen days by the injection of large amounts of this hormone. A decrease in adrenal weight occurs, despite androgen treatment, as the length of the injection period is extended. The induction of spermatogenesis in hypophysectomized immature rats with testosterone propionate indicates that age is a determining factor. Spermatid formation can be induced in a small percentage of rats hypophysectomized at twenty-seven days of age and treated for ten to fifteen days but no spermatozoa are formed. Extended treatment results in tubular damage. The formation of spermatozoa is observed in androgen treated rats hypophysectomized at thirty-three days of age. Seminal vesicle weight is markedly increased.

A group of 556 normal immature female mice were used to determine the influence of testosterone propionate on the ovary as well as the influence of testosterone propionate pretreatment on the ovarian response to either chorionic gonadotropin or equine gonadotropin. Ovaries were observed at daily intervals from three to seven days after a single subcutaneous injection of one milligram of the androgen. Ovarian weight of the immature mouse was not increased but a histologically visible stimulating action was evident. The gonadotropic action of chorionic gonadotropin and of equine gonadotropin used in dosages capable of producing an ovarian weight increase is suppressed by pretreatment of the mouse

with testosterone propionate. The effect is best observed when a seventy-two or ninety-six-hour period elapses between the single androgen injection and the first injection of gonadotropin. A dosage of 0.25 milligrams of testosterone propionate was just as effective as the one milligram dose. The action of the androgen in altering the effectiveness of chorionic gonadotropin on the mouse ovary is contrary to results obtained in rats.

In collaboration with Dr. Ralph P. Reece it has been demonstrated that a marked increase in ovarian weight of the immature rat can be produced by injecting a single adult male rat pituitary suspended in alkaline water. Furthermore, ovarian weight response varied with the age of the donor male rat when the latter was not an adult. A twenty-four-day old male rat pituitary failed to increase ovarian weight in the recipient but the pituitary from a forty-day old male rat caused a one hundred percent increase in ovarian weight. As the age of the donor increases the size of the pituitary also increases but when the amount of tissue injected is considered it will be found that 3.2 milligrams of anterior lobe tissue will produce a marked increase in ovarian weight of the recipient regardless of the age of the donor. Although it has generally been conceded that the adult male rat pituitary is predominantly follicle stimulating in nature, our results show that at least half of the ovaries from recipient animals contained corpora lutea and therefore the presence of luteinizing hormone is indicated.

The anterior pituitary glands from adult female rats were tested for gonadotropic potency. As many as three pituitaries were shown to be without effect if their total weight did not exceed 23 milligrams. This is in marked contrast to the potency of the male rat pituitary. A stimulating action was obtained with 43.6 milligrams of adult female rat pituitary tissue and the luteinizing action was marked.

The gonadotropic action of one-half of a male pituitary was augmented by the simultaneous injection of three adult female pituitaries. Injections were made subcutaneously and at different sites. The action of equine gonadotropin on the ovary was augmented by injecting simultaneously either one-half of one normal adult male pituitary or one normal adult female pituitary.

LEATHAM, JAMES HAIN, 1943. Report of Progress. Yr. Bk. Amer. Philos. Soc. for 1942: 167-168.



- 1943. Response of Hypophysectomized Immature Male Rats to Pregnant Mare Serum. *Proc. Soc. Exper. Biol. and Med.* 53: 209-210.
- 1943. Influence of Testosterone Propionate on the Ovarian Response of Immature Mice to Gonadotropins. *Proc. Penna. Acad. Science* 17: 65-71.
- 1944. Action of Equinine Gonadotropin in Normal and Hypophysectomized Immature Male Rats. *Amer. Jour. Physiol.* 140: 561-566.

ALEXANDER SANDOW, Washington Square College of Arts and Science

Grant No. 658 (1942), \$1,250. Study of the effect of pH, tissue poisons, and anisotonicity on the mechanical events of the latent, contraction, and relaxation periods of skeletal muscle contraction.<sup>1</sup>

A piezoelectric cathode-ray oscillographic method has been devised to record the mechanical changes that occur during the latent period. The apparatus acts, in effect, as an electronic lever which converts the minute latency length change into a 500,000-fold magnified deflection on the cathode-ray screen. Changes in muscle length as low as  $0.01 \mu$ , equivalent to a change in muscle tension of about 4 mgm., can be easily detected. Single sweeps of the oscillograph provide a time axis for the mechanical changes, and a 10,000 cycles per second timing wave impressed on each sweep permits time intervals to be measured with a precision of  $\pm 0.03$  ms. A typical latent period record begins with a mechanically quiescent phase; this is followed by a sigmoid relaxation phase, the latency relaxation (abbreviated,  $L_R$ ), which is terminated and reversed abruptly as the muscle passes into its contraction phase. The presence of a precontractile relaxation phase in the response of a muscle was first demonstrated by Rauh in 1922.<sup>2</sup> All the experiments of the present research were performed on the excised sartorius muscle of the frog. The most significant variables of the latent period and their characteristic values for the frog sartorius at room temperature are:  $L_R$ , the time from the instant of stimulation to the beginning of the  $L_R$ , 1.50 ms.;  $L_T$ , a similar time to the beginning contraction, 3.00 ms.; and  $R$ , the magnitude of the  $L_R$ ,  $0.10 \mu$ . The

<sup>1</sup> Due to a long delay in obtaining a major piece of apparatus, the project for the experimental work under this grant had to be changed and the grant was used for studies of the latent period of muscular contraction with particular reference to the latency relaxation. The results of the modified project are presented in this report.

<sup>2</sup> Rauh, F., Die Latenzzeit des Muskelementes. *Z. F. Biol.* 76: 25-48 (1922).

following studies of the latent period have been made. The technical work of this research has been done by Mr. A. G. Karczmar.

1. *The effect of the position of the shock.*  $L_R$  is a fairly linear function of  $D$ , the distance from the stimulating cathode to the end of the muscle connected to the stylus of the piezoelectric pick-up, regardless of the polarization of the shock electrodes.  $R$  decreases, apparently linearly, with  $D$ . These results indicate that the  $L_R$  is propagated along the muscle length as an elastic wave of constant velocity and decreasing amplitude. The velocity of the wave in a muscle under an initial tension of 3 gms. is about 4.0 cm./ms., and it is increased when the initial tension is increased. The decrease in  $R$  with  $D$  is attributed to the muscle viscosity. The nature of the propagation of the contraction wave is as yet unclear.

2. *The effect of veratrine.* The latency behavior of the first twitch of a veratrinized muscle is normal. Veratrine affects the latency behavior only if the muscle has been just previously activated, and then, in general, the effect is only to reduce  $R$ . The effect on  $R$  is more pronounced, the closer is the test twitch to the conditioning activity. The effect of veratrine on  $R$  seems to be proportional to the logarithm of its concentration. These results indicate that in some respects the effect of veratrine on latency relaxation and on post-contraction relaxation are similar. Further study is required, however, to determine the exact nature of the veratrine latency effect.

3. *The effect of temperature.* As the temperature is varied from 10 to 40° C.:  $L_R$  and  $L_T$  both vary inversely with temperature;  $R$  increases to a maximum at about 22–24° and then falls at higher temperatures until at 40° it is only a few percent of the maximal value. If a muscle is kept at 40° for several minutes and then returned to a temperature of 23° (at which  $R$  is normally a maximum), the values of  $L_R$  and  $L_T$  are those normally characteristic of that temperature, but  $R$  is only partially reactivated. The study of the inactivation of  $R$  at higher temperatures leads to the following conclusions: (a) relatively sharp reductions in  $R$  occur around 38°; (b) the possibility of reactivation of  $R$  is relatively sharply reduced in a muscle that has been exposed to temperatures of 38°; (c) complete and irreversible inactivation of  $R$  results from exposures to temperatures greater than 40°.

Since  $R$  passes through a maximum with increase in temperature, and since its inactivation by exposures to temperature up to

40° may be partially reversed by restoration to a lower temperature, it is therefore inferred that the latency relaxation is an expression of the activity of an enzyme. Furthermore, it is noteworthy that the two critical ranges for the inactivation of  $R$ , one around 38°, and the other above 40°, are the same, respectively, as those at which thermal contraction and thermal rigor occur in live muscle, and at which primary and secondary heat denaturation occur in extracted frog myosin;<sup>1</sup> it is therefore concluded that the  $L_R$  is a property of the myosin activated in some manner by the stimulus applied to the muscle. Since the temperature experiments indicate that the  $L_R$  seems to be associated with an enzyme, on the one hand, and with myosin, on the other, and since it is now known<sup>2</sup> that myosin acts as adenosinetriphosphatase, and that myosin threads in specifically catalyzing the hydrolysis of ATP (adenosinetriphosphate) undergo a relaxation, it is therefore inferred that the  $L_R$  is a mechanical sign of the interaction of myosin and ATP in the stimulated muscle.

4. *The effect of pH.* The pH of the muscle has been altered by exposing it to different mixtures of  $CO_2$  and  $O_2$  (or  $N_2$ ) in bicarbonate-buffered Ringer's solutions. As the pH increases from 6.0 to about 8.8:  $L_T$  decreases throughout the entire range,  $L_R$  decreases up to about pH 7.0 and then remains fairly constant, and  $R$  increases up to about pH 7.0 beyond which it seems to remain constant. The behavior of  $L_R$  and  $L_T$  as a function of pH is direct evidence in support of an inference previously made<sup>3</sup> that the latency changes caused by the muscle's own activity and recovery therefrom are due to the pH changes induced by the activity. Since the rate of tension development during the latent period, as measured by the reciprocal of  $L_T$ , and the rate of hydrolysis of ATP in both muscle mash and purified myosin solution, both increase with increase in pH in the range of the above experiments, it is inferred that tension development in contraction is dependent on the hydrolysis of ATP. Thus the pH experiments independently lead to the view, already obtained from the study of the effects of tempera-

<sup>1</sup> Mirsky, A. E. Contraction of muscle and denaturation of myosin. *Proc. Soc. Expt. Bio. Med.* 37: 157-159 (1937).

<sup>2</sup> Engelhardt, W. A. Enzymatic and mechanical properties of muscle proteins. *Advances in Contemporary Biology* 14, Edition 2 (1941).

<sup>3</sup> Sandow, Alexander. The effect of tetanus on muscular latency relaxation in normal and iodoacetate-poisoned muscles. *Anat. Rec.* 84, No. 4: 21 (1942).

ture, that the hydrolysis of ATP is intimately associated with the development of tension in contraction.

5. *A kinetic theory of tension development.* In mathematical elaboration of the above view, the following assumptions are made: (a) The stimulus causes the formation of an enzymatic intermediary complex between myosin and ATP which is the form of myosin responsible for the latency relaxation, and during whose existence the myosin is energized for contraction; the myosin released from the intermediary complex, along with the relatively energy-poor products of ATP hydrolysis, is contracting myosin. (b) Monomolecular reactions govern the transformations of resting myosin into relaxed myosin-ATP complex, and of the latter into contracting myosin. (c) The tension of the responding muscle at any instant is proportional to the algebraic sum of the tensions, negative and positive, respectively, attributable to the relaxed and contracting myosins present at that instant. The theory leads to a formula for the development of tension in a tetanus and to certain qualitative results that accord with muscle behavior in several important respects, especially in that the theoretical tension curve has an initial negative phase like that of the experimental latency relaxation. The theory, however, requires further test; and research now projected that is concerned with the nature of the contraction, and the post-contraction relaxation, phases of muscular activity should, among other things, determine whether the theory is substantially correct.

- SANDOW, ALEXANDER, 1943 (with KARCZMAR, A. G.). The Effect of Temperature on Muscular Latency-Relaxation. *Fed. Proc.* 2, no. 1: 43.
- 1943 (with KARCZMAR, A. G.). Latency-Relaxation in Veratrinized Muscle. *Fed. Proc.* 2, no. 1: 43.
- 1943 (with KARCZMAR, A. G.). The Effect of Position of Shock on the Mechanical Events of the Latent Period of Muscular Contraction. *Anat. Rec.* 87, no. 4: 41-42.
- 1943 (with KARCZMAR, A. G.). The Effect of High Temperatures on the Inactivation of Muscular Latency-Relaxation. *Anat. Rec.* 87, no. 4: 42.

ALBERT TYLER, California Institute of Technology

Grants No. 627 (1942), \$600; and No. 693 (1943), \$600. Production and properties of univalent antibodies.

Further investigations of the method previously reported for the conversion of antibodies into the univalent (non-precipitating

or non-agglutinating) form, namely, irradiation of antisera with visible light in the presence of eosin, have substantiated its effectiveness on a variety of antibodies. The conversion is obtained with concentrations of eosin ranging from 0.05 to 1.0 percent and without appreciable loss in combining power when the irradiation is not continued beyond the time when the precipitating or agglutinating titer of the antiserum has disappeared. The experiments have been run mainly with rabbit antisera against sheep red cells, pneumococcus III, sea-urchin sperm and keyhole limpet sperm. Some tests have been made with the iso-agglutinins in human sera and the natural hetero-agglutinins for human cells in beef serum.

At present 142 tests (82 "uterine-strip" and 60 "gross") have been made of the ability of the treated (and control) rabbit antisera to elicit anaphylactic shock in sensitized guinea-pigs and also to induce sensitization. The results show a marked decrease in the ability of the treated antisera to act as shocking antigens. In 24 gross anaphylaxis tests with the rabbit anti-sheep sera (to which guinea-pigs are normally sensitized because of the presence of Forssman antigen in their tissues) fatal reactions were obtained with intravenous doses of 0.3 to 0.8 cc. of the untreated antiserum, while little or no symptoms were obtained with 6 to 15 cc. of the irradiated-eosin-treated antiserum. Similar results were obtained in 18 gross anaphylaxis tests with guinea-pigs actively sensitized to rabbit serum. In 44 Schultz-Dale uterine-strip tests with actively sensitized guinea-pigs, using in general one horn for control serum, the treated antisera gave no response with 100 to 2,000 times the control shocking dose (0.0005 to 0.001 cc.). Larger doses gave occasional (non-specific?) reactions. The 18 gross anaphylaxis and 38 Schultz-Dale tests of guinea-pigs injected with treated antisera have given rather irregular results. In general they show that the treated antisera can actively sensitize to untreated sera, although their antigenicity in that respect has evidently been much reduced. In animals so sensitized the shocking dose for treated antiserum is in general greater than that of control serum. There is, then, no evidence of an altered specificity but rather of a reduction in antigenicity.

In a continuation of the experiments with lobster serum, normal hetero-agglutinins have been found that act on cells of a large variety of vertebrates and invertebrates. Absorption tests have shown that there are at least six distinct group agglutinins present and

that each acts on all the animals tested within the group, which may comprise one phylogenetic class or in certain cases two or more widely separated classes (e.g. a single agglutinin for mammals and sea-urchins). Hemocyanin, which Allison and Cole<sup>1</sup> and Clark and Burnet<sup>2</sup> considered to be the sole protein present in lobster serum does not carry the agglutinating activity. In collaboration with Dr. B. T. Scheer and Dr. S. Swingle a new protein has been isolated chemically and electrophoretically and this component is found to be active hetero-agglutinin.

TYLER, ALBERT, 1943. Report of Progress. Yr. Bk. Amer. Philos. Soc. for 1942: 180-182.

— 1943. Conversion of Antibodies into the "Univalent" Form. Federation Proceedings 2: 102.

### MEDICINE

HENRI LAUGIER and LOUIS-PAUL DUGAL, University of Montreal  
Grant No. 668 (1942), \$1,800. Research on the healing of war wounds and the repairing of tissues.

In a paper published in December 1942<sup>3</sup> we described the effects of calcium precipitating agents, like oxalic acid and sodium oxalate, on the rapidity of wound healing. The present investigation was undertaken to see if a calcium precipitating agent like oxalic acid, used at the best concentration found for that purpose (2%) does keep its accelerating effect in the presence of a substance like sulfathiazole, universally employed to prevent infection and delays in wound healing.

Using the same technique as the one described in the paper already referred to, we compared the speed of healing of control wounds treated with sulfathiazole alone (saturated solution in water) and experimental wounds treated with sulfathiazole (saturated) + oxalic acid 2%. The animal used was the rabbit.

As in our previous work on this subject, all the results come from the comparison of two wounds (symmetrical, approximately equal, and of the same depth) of the same animal, but treated with different solutions as described above.

The solutions were applied every twenty-four hours on each

<sup>1</sup> Jour. Biol. Chem. 135: 259-265 (1940).

<sup>2</sup> Austral. Jour. Exp. Biol. 20: 89-95 (1942).

<sup>3</sup> Revue Canadienne de Biologie 1: no. 7, 687-720 (1942).

wound in the following way: a fine-mesh gauze was soaked with the solution to be tried, and placed on the wound where it was made to adhere with adhesive plaster of  $\frac{1}{2}$  inch width in most cases.

The results of forty-three experiments in which we compared the effects on the rapidity of healing by sulfathiazole + oxalic acid 2%o with sulfathiazole alone are the following: thirty-one experiments were positive (31 out of 43 = 72%) with an average gain of 4.3 days out of an average of 21.3 days or 20.2 percent, three were negative (6.9%) and nine (20%) did not show any significant gain or loss. In other words, the experimental wounds treated with oxalic acid + sulfathiazole healed faster, *20 percent faster than those treated with sulfathiazole alone, in 91 percent of the experiments*, if the nine doubtful experiments are excluded.

More experiments are actually in progress with the same substances (oxalic acid + sulfathiazole on wounds, and sulfathiazole alone on control wounds) but the application of oxalic acid on the experimental wounds is discontinued at different periods during the course of healing. The reason for doing this is the fact that the calcium precipitating agents seem to have a great accelerating effect on the contraction period of the healing process, but no effect except maybe a little delay on the epidermisation period. The finding of the best moment for stopping the application of oxalic acid would probably result in a greater gain than has been actually obtained.

From observations made in the laboratory, it seems that there is a pH effect on the rapidity of healing.

### CLASS III. SOCIAL SCIENCES

#### ECONOMICS

JOHN F. NORMANO, Research Bureau for Post-War Economics,  
New York

Grant No. 681 (1943), \$400. Investigation of western influences in the development of economic thought in Russia.

The development of economic thought in Russia can be compared to a musical fugue. One after another, new voices enter the field, follow one another, coexist, interrelate, and contribute to the general construction even through their fights for dominance. In every stage one of the voices is the typical, the leading. That was

the case of the evolution of economic ideas in Russia. English, French, German, and native ideas were the leading voices of this historical fugue in Russia. An investigation of all these influences disclosed the transitional character of the English and French influences, the persistently increasing German and that of German philosophy which served as a foundation of the Russian nativism as well as of the anti-Germanism. The course of Russian history and development of ideas in Russia were less rectilinear, more burdened by traditions, by geography, than in the United States.<sup>1</sup> In no other country was the transplantation and adoption of foreign ideas in the field of economics as strong and as rapid as in Russia. The idea of Russian cultural isolation is a myth in the field of economics. No other country so peculiarly recreated foreign economic ideas and attempted to adjust them immediately to its own conditions. No other country fought against imported ideas as violently as Russia. Nowhere else was the national economic thought moving in such a humanistic fog and at the same time continuously attempting practical applications of its grandiose schemes. Nowhere else was the theoretical idea of welfare and happiness of mankind so dominant over national elements. And at the same time the Russians showed themselves masters of realistic national economics.

The examination of material disclosed that even the Russian literature is not aware of the secular struggle of foreign ideas on Russian soil. It became necessary not only to trace the foreign influences but also to confront them with the native currents and follow up their fate. The investigation shows an outspoken resentment on the part of the great continental Russian economy to be ruled by insular economics of the English classics, and traces the spectacular penetration of Russia and Russian economic thought by German ideas, victorious over the French and English, and at the same time the stubborn and finally victorious self-defense of the Russians when Germany became not any longer a bridge for but a barrier to the full development of Russian productive forces. The study discloses in the case of Russian economics the same ethical character and grand style which permeate Russian belles-lettres and suggests that Russian economics—similar to American—are more a product of the man-in-the-street than of academic teachings. There are other similarities with the United States: the two continental

<sup>1</sup> Normano, J. F. *The Spirit of American Economics*, New York, John Day, 1943.



giants were constantly and feverishly searching for transformation; in both of them the "transformers" strived for immediate application. But while the English inheritance brought with it to the United States an individualistic stamp, the Russian tradition was one of a quest for "Sobornost"—this untranslatable word which is the contrast of western liberal individualism.

The course of investigation led to a historical study of philosophical, social, and political currents in Russia since the end of the 18th century as especially in Russia they are inseparable from economic ideas. Literary movements had to be taken into account in view of the social character of Russian literature. In some cases special episodes had to be examined in detail as, for instance, the Russian peregrinations to Goettingen, meetings with Schelling and relations with Karl Marx. Excurses on Smithianism and Saint Simonism had to be inserted. In all cases a parallel discussion of ideas expressed by the government, intelligentsia, and the academic profession is presented.

The investigation arrives at the conclusion that in the historical fugue of the evolution of economic ideas in Russia, Bolshevism became the last chord the harmony of which crowns the musical piece. In the investigation of the last twenty-five years more attention had to be given to actions than to development of ideas. Consequently the trends of change of the practice of Bolshevism had to be considered. A retrospective analysis of Bolshevism after a quarter of a century of its existence disclosed its outspoken traditionalism. It is a reaction against foreign influences and at the same time an attempt at a synthesis of traditional Russian ideas against the Marxian background. In its loves and hatreds, longings and recollections, hopes and disappointments, in its words and deeds, Bolshevism appeared as a natural continuation of the Russian intellectual and moral climate; it is the culmination of the economic ideas germinating in Russian soil in the hundred years preceding the Russian revolution. The passion of destruction and the grand style of construction, the furor technicus which was admired early in Russian social Utopias, the idea of the human being daring to make his own history are old Russian notions. The theory of special ways of Russian history and its messianism are also—*mutatis mutandis*—national as well as the Russian historicism so in vogue at present in the Soviet Union. Anti-German trends and hatred of the bourgeoisie are traditional and not new features of Bolshevism,

not less than the main thought of the primacy of social changes over political and lack of interest in individual political and economic freedom. Even the organizational features of the party with its dogmatism and intolerance, instability and fervor, tendency to rule by coercion for the public welfare are explained as traditional in the history of Russian economic and social thought.

On the other hand, in the field of theoretical thought Russian economics since the revolution of 1917 did not continue the work of its predecessors. After a brief period of factional theoretical fights the new style of Russian economics moved decidedly toward problems of application developing a kind of *neo-cameralia*. The purpose, method, and spirit of Russian economics changed as a result of the collectivistic planned character of the economy. The Russians are developing a new style that might be called "constructional economics." A brief survey of Soviet economic literature, periodicals, and institutes is presented.

In view of the fact that hundreds of writers and thinkers mentioned in the study are unknown to the Western reader, a special glossary is in preparation giving brief data on each of them.

NORMANO, J. F. Economic Ideas. U. S. S. R. Economy and the War (ed. by R. J. Kerner), New York, 1943, 66-69.

### MODERN HISTORY

CHESTER McARTHUR DESTLER, Elmira College  
(now at Connecticut College)

Grant No. 617 (1942), \$450. Preparation of a biography of Henry Demarest Lloyd.

This is a study<sup>1</sup> of Toledo's experiment in 1889-99 with a municipally owned and operated natural gas plant that drew its supply from the Findley gas field. The attempt to initiate this enterprise was motivated by a desire to "boom" Toledo by furnishing the gas "free" or at very low cost to manufacturers and other consumers as the towns in the Findley gas territory were doing. Aside from the effect that this was expected to produce upon Toledo's population, industrial growth, and real estate values, the project found justification in general popular resentment at the business methods of the Northwestern Ohio Natural Gas Company and the Toledo

<sup>1</sup> Destler, Chester McA. The Toledo natural gas pipe-line controversy. Quar. Bull. Hist. Soc. Northwestern Ohio **XV**: 76-110 (1943).

Gas Company which were supplying the city before the municipal plant was authorized, in indignation at the monopolistic control of both companies by Standard Oil interests, and in a general belief that the gas was produced spontaneously and *in perpetuum* in the Trenton limestone that underlay northwestern Ohio.

The attempt to induce Toledo to undertake and operate a municipal natural gas plant and pipe-line was opposed not only by local conservative business interests but also by the gas companies. These corporations had entered the city on invitation from local capitalists who had also invested in them. They enjoyed franchises that specifically reserved to the city the right to charter competitors or to conduct a municipal plant. Instead of acquiescing when powerful sentiment developed in support of the municipal pipe-line, the two gas companies and the Standard Oil interests behind them opposed the movement stubbornly. After the legislature had authorized the municipal line and the electorate had approved it, the Standard interests carried their case to the state and federal courts without avail. They then attacked the credit of Toledo with such effect in the money marts that investment bankers refused to bid on the gas bonds despite the fact that they were backed by the full taxing power of the city. Competitive bidding against it for gas territory and systematic under-draining of gas from lands acquired for the municipal project, were also indulged in while completion of the city pipe-line was delayed by the boycott on the gas bonds. Eventually the Toledo Common Council took up the bond issue and the municipal line and plant were completed by the end of 1893. The litigation and delay involved in the contest with the Standard Oil interests entailed a loss of \$1,000,000 on Toledo and was followed by premature exhaustion of the city's gas territory. After additional territory secured in Ottawa county, Ohio, was exhausted, Toledo abandoned the struggle and sold its pipe-line for a pittance to the Northwestern Ohio Natural Gas Company. This corporation had absorbed the second company and reformed its business methods, after the Standard Oil controlled Toledo *Commercial* had failed to win friends for the Northwestern Ohio Company by abusing all friends of the municipal plant. Meanwhile, as the result of the competition of the city pipe-line, gas rates in Toledo had been kept at a competitive level and customers of both private and municipal plants had benefitted largely.

This article was written at the request of the Hayes Foundation,

which had extended a grant in aid in 1940 in aid of the author's research on Henry Demarest Lloyd. Research on the subject was undertaken as part of this larger project in order to test the validity of Chapters XXII-XXVI in Henry D. Lloyd's *Wealth Against Commonwealth* whose general accuracy has been impugned in a most sweeping manner by Allan Nevins in his recent biography of John D. Rockefeller. The result of this independent investigation into the history of the struggle between Toledo and the Standard Oil interests is to substantiate most of the account written earlier by Henry D. Lloyd. It is interesting to note also that much of this verification rests upon letters in the John D. Rockefeller papers that were written by natural gas company officials in the Standard Oil system who were personally informed on the question and upon letters from Judge John H. Doyle, who was attorney of the Northwestern Ohio Natural Gas Company in Toledo during the period under examination. The chief criticism of Lloyd's account to be derived from this study should be directed at his failure to mention the interested motives of some advocates of the municipal pipe-line, to recognize the highly speculative character of the entire natural gas business, and to detect the fallacious geological theory that underlay much of the popular support of the municipal enterprise. His account of the contest between the city and the Standard Oil interests, however, is highly accurate.

ALBAN WILLIAMSON HOOPES, Spring Mill, Pa.

Grant No. 678 (1943), \$1,000. Studies upon the history of the relations between the Indian tribes and the United States government, 1865-1900.

During the period from July 1 to December 15, 1943 the following work was prosecuted:

(1) The month of July was devoted entirely to work upon the Welsh Collection at the Historical Society of Pennsylvania in Philadelphia. This collection was acquired by the Historical Society in 1937. Possibly two thousand of its fifty thousand items are concerned directly with the affairs of the Indian Rights Association of which Herbert Welsh was a founder and one-time president. The papers in question are of great value, throwing new light upon (a) the political history of several of the Sioux agencies, (b) Navajo affairs, particularly during the years 1894-98, (c) Indian policy in

general and Indian education in particular. In spite of its importance, the history of the Indian Rights Association has never been adequately studied. So far as has been ascertained, no other research project thus far has utilized this material.

(2) Two weeks in August were spent in Ottawa, upon an investigation of material relating to the Sioux in the Indian Affairs Branch of Canada. More particularly, careful study was given to the history of British and Canadian policy insofar as it was concerned with Sitting Bull and the Sioux refugees. Two important groups of Sioux refugees from the United States found asylum in Canada: (a) those that fled from Minnesota after the massacre of 1862, and (b) Sitting Bull and his followers who fled the States after Little Big Horn in 1876. Although the story of Little Big Horn is quite well known, that of the Sioux after they reached Canada is almost unknown. Many documents dealing with the latter topic were examined. It is believed that the basic data necessary for a new chapter of Sioux history has been obtained.

(3) A short trip to Boston and Worcester, Massachusetts, was devoted to a brief examination of the Francis Parkman letters and some files of western newspapers in the libraries of the Massachusetts Historical Society and the American Antiquarian Society respectively. While this material was of great interest in regard to Indian affairs in general, little of it was pertinent to the period under consideration.

(4) In November the Minnesota Historical Society at St. Paul was visited. The papers of Bishop Henry B. Whipple and General Henry H. Sibley were made the subject of detailed investigation. Considerable information was obtained upon the work of the missionaries, especially the Episcopalians, among the Chippewa and Sioux; and upon the Sioux commissions from 1865 to 1875. The latter supplements material studied in the National Archives in Washington. The principal results of the work in the Minnesota Historical Society may be listed as follows: (a) A clear definition of the character and personality of Bishop Whipple and General Sibley; (b) A considerable amount of material *in re* the part taken by the clergy in the education of Chippewa and Sioux children; (c) Decidedly unfavorable sidelights upon governmental management of agency affairs; (d) Data upon the Sioux commissions.

In conclusion it may be said that undoubted progress has been made since the award of the grant in July. Much of this has in-

volved work in hitherto unused or little used manuscript collections. Particularly is this so in the case of the Welsh Collection and the material studied in Canada. It is my intention to go to Lincoln, Nebraska, to work in the Ricker Collection, and to the State Historical Society of Colorado at Denver soon after the turn of the year.

HOOPES, ALBAN WILLIAMSON, 1943. Preliminary Report upon the Correspondence of the Indian Rights Association in the Welsh Collection. *Pennsylvania Magazine of History and Biography* **LXVII**: 382-389.

HANS HUTH, U. S. National Park Service, Chicago, Ill.

Grant No. 679 (1943), \$300. Study on the means by which, in this country, history has been or can be visualized, in order to stir interest in history.

Since war restrictions of various kind have greatly hampered travelling, a number of intended visits to historical areas, monuments, etc., could not be carried out; present conditions have also made it necessary to limit the time devoted to the intended study.

Still, it was possible to inspect most of the Lincoln sites in the Middle West and to do research work at New York Public Library and at the Library of New York Historical Society.

Considerable material concerning all parts of the study has been compiled. Most of the necessary data concerning the first two sections (Symbols and Memorials) have been collected. Various series of Congressional Papers as well as a number of contemporary magazine files served as some of the major sources.

Concerning symbols it seems remarkable how long it took Congress to find adequate patterns for the flag, the seal, and the currency. Also there was much vagueness as to the definition of these designs and little determination in directing the use of the flag. Since we are so accustomed to the use of symbols to foster ideas, it would seem that Congress missed an opportunity through this reluctance to act. But probably the small importance attached to any of the federal symbols was due to the initial situation, when federal ties were but feeble and regional feeling prevailed. The strengthening of the former and yielding of the latter is well reflected in the later history of symbols.

It seems worthwhile to note that the study on memorials has already been put to practical use. The chairman of a State Committee, assigned to resolve about erecting some memorial, asked the

author to write an opinion about the wisdom of erecting a monument. The answer was given in a detailed memorandum, which was lively discussed by the Committee. This section concerning monuments is the one which is most advanced and already permits one to draw certain conclusions about the trends throughout the 19th century.

The study on section 6 (Historical Sites) brought to light some new evidence concerning the early beginnings of this type of preservation work. The fact had been obscured that as early as 1822 General Henry A. S. Dearborn had placed a paragraph in a Boston paper for the purpose of rallying patriots who would be willing and able to preserve the entire battlefield of Bunker Hill as long as there still was a chance, for future generations would "hold that blood-stained height in proud remembrance." As a rule Washington's Newburgh Headquarters and Mt. Vernon have been regarded as the first sites to have been designated for permanent preservation in this country. While these facts remain, the new evidence shows that the idea of preserving revolutionary areas already moved patriots three decades earlier. The driving power behind the action taken on behalf of Bunker Hill as well as of Mt. Vernon even came from one and the same man, Edward Everett. In the light of the other great issues of the day it seems remarkable that public response to this national appeal was more favorable in 1853 than it was around 1824.

Indirect aid to the preparation of Part B (Present trends in visualizing History) was given to the author through his assignment to reshape the Lincoln Museum at the Ford Theatre in Washington, D. C. The guiding thought in carrying out this commission was to organize the heterogeneous mass of historical objects in such a way as to use them as documentary material to illustrate or symbolize certain problems or moves in Lincoln's career, according to a program the author defined previously and independently of the actual collection. Then it was decided, which objects would fit into the new design, which would have to be stored and in which cases new objects would have to be looked out for. This intention to acquire new objects, does not mean that original documents etc. would have to be purchased. For the time being photos or photostats will do very well, until it may be possible to buy better material at some later time. This procedure will be used to demonstrate the author's conception of the basic methods, which must be em-

played to build up an historical museum, so that it may be regarded as a valuable factor in modern education.

ELSIE MURRAY, Tioga Point Museum, Athens, Pa.

Grants No. 470 (1940), \$800, and No. 706 (1943), \$600. Study of the French Refugees on the Susquehanna.

The French refugee colony known as Azilum, projected in 1793 by Louis de Noailles and Antoine Omer Talon, then resident in Philadelphia, and in 1794 supported by the Asylum Company organized by Senator Robert Morris and John Nicholson, with a capital of warrants and patents for northern Pennsylvania wildlands to the amount of a million acres, has received scant notice from Pennsylvania historians. Other developments on the northern border, outgrowths of or associated with the Asylum project, notably the Ceres venture covering 300,000 acres in the highlands and game preserves of what is now McKean, Potter, Clearfield, and adjacent counties, and the Le Ray de Chaumont investment of 80,000 acres in the rugged country eastward between the Susquehanna and the Delaware (in present Bradford, Susquehanna, and Wayne counties) are ignored or misrepresented by the older county historians and their successors.<sup>1</sup>

Reasons for the selection by the French originators of the Asylum project of a key site in the wilderness of the upper Susquehanna, as well as the causes of the failure of this and the related projects to mature with the expected despatch are often misrepresented. Doubt is thus cast on the integrity and sound judgment not only of Talon and Noailles, Morris and Nicholson, but also of the two men sent out from Philadelphia in August 1793 to select a town site, bearing letters of introduction from Robert Morris to prominent businessmen along the Susquehanna. The two scouts and advance agents were Adam Hoops and Charles Bué Boulogne.

Hoops' qualification, research reveals, was not alone his familiarity with the terrain gained in 1779 when as a 19-year-old aide he had accompanied General John Sullivan up the Susquehanna and the Chemung and into the Indian country—knowledge already utilized in the survey and appraisal of the three-million-acre Iroquois tracts west of Seneca Lake purchased of Massachusetts in

<sup>1</sup> Beers, F. W. *History of McKean, Elk, Cameron, and Potter Counties* (1890); Blackman, E. C. *History of Susquehanna County* (1873).



1791 by Robert Morris and now western New York State. Birth, early family surroundings and subsequent experiences, it now appears, qualified Hoops further for his wilderness assignment. Member of a family long prominent in Chester County annals, he was born in 1760 in the frontier town of Carlyle, where his father, Adam Sr., one of five commissioners active in cutting a road for Braddock through the wilderness to Fort Duquesne, serviced the colonial commissariat through the French and Indian wars.<sup>1</sup>

Adam Jr., leaving his studies to join the patriot army, accompanied Sullivan's Expedition. Later, taken prisoner by the British at Camden, he was paroled to France, where, provided with letters to Franklin and his grandson, he lived two years, acquiring the language and a familiarity with French taste and ways of living. During the initial years of its expenditure he kept the accounts of the Azilum colony, and directed the cutting of the forest post-road toward the West Branch. Of proven integrity and sound sense, he was next called upon to explore and appraise the Bingham lands to the west prior to Talon's purchase for the Ceres project. Here, like others of his time, misled by the magnificent stand of white pine, he may have overestimated the farm value of the alpine border. Obsessed with a vision of our continental destiny and the imminence of westward expansion, he himself purchased a little later a twenty-thousand-acre tract at the head of navigation of the Allegheny, not far distant from Cerestown, but on the New York side of the border, in the Holland Purchase. Though honored as the founder of Olean, he returned to die in West Chester.<sup>2</sup>

Of Charles Bué Boulogne's origin and history little is discoverable. He is probably identical with the "M. Boulogne" who in 1790 accompanied the first shipload of Scioto Company emigrants from Havre to Alexandria. Joel Barlow, author of the "Vision of Columbus," a poetic prophecy of America's future as the home of liberty, sent to Paris in 1788 as the Company agent by William Duer, declared Boulogne came to him "well recommended": but Major Isaac Guion who took charge of the second stage of the

<sup>1</sup> Colonial Records, VI and IX (1851-52); Papers of Colonel Henry Bouquet (ed. by Penna. Hist. Comm.) (1942-43).

<sup>2</sup> Brooks, M. D. A sketch of the Early Settlement of Olean and Its Founder, Major Adam Hoops (1898), and History of Olean, in *The Historic Annals of Southwestern New York*, 2: 642-78 (1940); King, M., and Mann, M. W. *The History of Ceres* (1896); Beebe, V. L. *History of Potter County* (1934); the Cope Papers in the Genealogical Society of Pennsylvania; and the Franklin Papers in the American Philosophical Society.

journey to the Ohio, expressed distrust.<sup>1</sup> The small D'Autremont-Lefevre-Brevost group to whom Boulogne sold some of Morris and Treat's lands in the Chenango valley above Azilum were also dissatisfied, and when the latter colony was under way were brought down by boat.<sup>2</sup> Their correspondence from 1797 to 1807, after the return of the eldest D'Autremont son to France, along with the Lefevre will, lately copied for the museum files, affords an interesting picture of the period. Boulogne supervised the building and ordering of supplies from Wilkes Barre in the early days of the colony, as letters and accounts in the Wyoming and Tioga Point Historical Societies show, and met his death on a journey along the new post-road in 1796.

An incident in the history of Gallipolis, the Scioto colony on the Ohio, recounted by William Sibley,<sup>3</sup> may explain the erroneous report that yellow fever once made its way to the Azilum colony, whereas the choice of a site far inland and high up on the Susquehanna was doubtless motivated in part by the 18th century belief that this scourge was ineffective a certain number of miles inland and above a certain altitude. In 1878, however, an unfortunate chain of incidents brought an infected boatload from New Orleans up the Mississippi and the Ohio to Gallipolis.

Not only were there numerous reasons, economic, political, and personal for the choice of the Azilum site, the causes of the collapse of many of the original plans also were multiple. Gallic volatility and lack of adaptability were perhaps the least of them, early moralists to the contrary. The old Pennsylvania-Connecticut controversy over land ownership between the 41st and 42nd parallels, and the obstinate refusal of settlers who had bought of the Susquehanna Company of Connecticut to cooperate with Pennsylvania's attempts to adjust claims, constituted the prime difficulty.<sup>4</sup> Both Talleyrand and the Duke de La Rochefoucauld-Liancourt after visiting the colony and sampling the unrest of the countryside advised their French friends against purchase in the "Wild Yankee" area.

Talon, when the course of revolution and events in Europe

<sup>1</sup> Belote, T. T. *The Scioto Speculation and the French Settlement at Gallipolis*. Univ. of Cincinnati Studies, 3 (1907).

<sup>2</sup> Murray, L. W. *The Story of Some French Refugees and Their Azilum*, 112-126 (1917); Murray, E. *Azilum, French Refugee Colony of 1793* (1940).

<sup>3</sup> Sibley, W. *Bronze John. The French Five Hundred* (1901).

<sup>4</sup> Murray, L. W. *Colonel John Franklin and the Last Stand of the Connecticut Settler*. Wyoming Commemorative Assoc. Proc. (1917).

complicated first his own affairs, then those of Robert Morris, shifted his interest to the region westward, presumably beyond the reach of Connecticut claims. In 1796 and 1797 he invested the capital of his Belgian friends in 297,000 acres purchased of William Bingham, Philadelphia merchant and banker, with whom Noailles was then in partnership. Even here, however, the long arm of the Connecticut company, whose secretary was now located at Athens, made itself felt. In 1796, 110 miles west of Athens, a new township, Lorana, in the northwest corner of what is now McKean County, where the oil city of Bradford stands, was granted to a couple of applicants; to be followed by four others along the northern border, two of which bear French names, Condé and Turenne.<sup>1</sup> No aggressive action against the Ceres colony is on record; but as late as 1844 the Connecticut interests carried out a coup against Pennsylvania agents eastward near Athens, seizing the papers of W. B. Clymer, of the Bingham office at Wellsboro, and his companion Secku Meylert, agent for the remainder of the Asylum Company lands. A handbill offering a reward for the apprehension of the offenders is preserved at the Wellsboro Land Office.

The general direction of the new Ceres Company was entrusted to John Keating, a young French-Irish refugee, originally of the Asylum Company. Keating secured the services of Francis King, a member of the Society of Friends, as surveyor, mapper and pioneer settler, and road builder. King, who had recently brought his family from London to Azilum village, in 1796 and 1797 began exploration, and moved his household into the wilderness on the headwaters of the Allegheny just east of the Seneca Indian Reservation. To the influence of the Kings and others of their sect who maintained a mission in this area is ascribed the refusal of the Indian tribes hereabouts to join the British in the War of 1812. For nearly seventy-five years Keating and members of his family made periodic visits to the colony, from Wilmington or Philadelphia, opening roads, encouraging settlers by liberal terms and an extension of credit, giving land for schools, churches, courthouses, naming the county-seats of Coudersport and Smethport for their European sponsors. Keating's descendants meanwhile won a name for themselves in the legal, medical, and cultural circles of Philadelphia.<sup>2</sup>

<sup>1</sup> Miner, C. History of Wyoming, 391 (1845).

<sup>2</sup> Keating, J. P. John Keating and His Forebears, in Records of the Amer. Cath. Soc., 29 (1918).

Inspection of the northern border of Pennsylvania from Bradford in the west to New Milford in the east reveals a second major reason for the inability of French capital or enterprise to speed up the agricultural or industrial development of this section. Heavily wooded, sparsely populated even today, entered or crossed at only a few points by railroads, the entire area constitutes the true "highlands" of the state. Its apparent backwardness is due less to the "machinations of the capitalist," as a recent writer has asserted, than to those of nature. Glaciation at an early period removed much of the humus, a fact concealed in pioneer days by a remarkable growth of white pine. In the western area, lumbering and migration down the Ohio lured the emigrant, rather than colonization and the carving out of farms. The discovery of oil and gas came later in this region, as did that of coal in the Asylum lands. Large areas of both remain forest and game preserves today, vacation sections rather than centers of population. Notable has been the attraction of this mountainous country for the idealist and experimentalist. Along with Fourier and Sylvania colonies, Ole Bull and Peter Armstrong communities have flourished briefly.<sup>1</sup>

Linked with the early history of the parent refugee settlement are a number of striking personalities, men bent on human betterment, such as La Rochfoucauld-Liancourt, Du Petit-Thouars and Keating, as well as progressive organizers such as the Piollets, who were foremost in canal and railroad construction. David Wilmot's devotion to the cause of abolition was developed in this sector. It may have been Captain Du Petit-Thouars who inspired Daniel Dobbins with the notion of the fleet on the Great Lakes which was to prove a determining factor in terminating the War of 1812. An old document in the museum shows that Dobbins plied an apprentice hand on La Grande Maison when a lad of 19. When Captain Du Petit-Thouars set out with Liancourt for Niagara, hopeful of discovering a Northwest Passage to the Pacific, Dobbins left also in the same direction, in 1795.

Investigation of the land investment in northeastern Pennsylvania of Le Ray de Chaumont, Benjamin Franklin's friend, is still pending. A fine map of the 1830's of his Bradford County holdings has been recovered.

MURRAY, ELSIE, 1941. Report of Progress. Yr. Bk. Amer. Philos. Soc. for 1941: 200-203.

<sup>1</sup> Pennsylvania Cavaleade (1942).

- 1943. French Argonauts of the Pacific. Amer. Soc. of the French Legion of Honor Magazine 13: 261-270.
- French Refugees on the Upper Susquehanna. Proc. Amer. Philos. Soc. 87: (In press.)
- Early Travellers up the Susquehanna. Northumberland Histor. Soc. Proc. 13: (In press.)

WILLIBALD M. PLOECHL, The Catholic University of America

Grant No. 701 (1943), \$500. Studies on the Church Laws for Orientals of the Austrian Monarchy during the period of the "Enlightenment" (18th century).

The task of reconstructing the Danube area, after the liberation of Vienna in the year 1683, confronted Austria with the problem of integrating large numbers of Oriental Christians in the monarchy. Ruthenians in Podo-Carpathia, Rumanians (Wallachians) in Transylvania, small sections of Croat and Serb settlers, and a stream of Serb refugee-newcomers, under the leadership of their patriarch, together with several communities of Greek and Armenian merchants, constituted this population. These Orientals were partly Catholic, and partly Orthodox.

Leopold I pledged religious freedom to the Orthodox Serb refugees. This privilege was renewed subsequently by all his successors. In accordance with the doctrine of the "Enlightenment," the Austrian rulers claimed the "Jus (Majestatis) circa sacra (eterna)," i.e. the right to legislate for the "external" matters of the various denominations. Immunity privileges, promulgated by Leopold I, and renewed by his successors, freed the Oriental clergy of the Ruthenian and Rumanian Catholics from the burdens of bondage, and compelled the lords of the manors to respect worship and religious obligation of the Oriental faithful.

These privileges were of greatest importance for social progress and emancipation of these people.

Persistent policy of the state, and adequate legislation helped to make the Catholic Oriental clergy independent from the jurisdiction of Latin (Roman Catholic) bishops, and to establish an Oriental hierarchy.

Complete equality of the Oriental rites with the Latin was a fundamental of church legislation, applied to Galicia, when this province became Austrian in 1772. Similarly, "latinization" of the Ukrainians was barred by rendering the change of Orientals to

the Latin rite more difficult. This was done in accordance with Papal decrees, but enforced by the state.

The Orthodox Church of the Bukovina received a new constitution in the so-called "Regulatory Plan of 1786." It laid the groundwork to one of the most advanced branches of the Orthodox Eastern Church.

The Orthodox metropolitan (patriarch) of Karlowitz eventually became the spiritual head of eight subordinate Orthodox Oriental bishoprics. The so-called "Austro-Serbian Church Law," a result of the "Enlightened" state legislation, forms indispensably part of the legal history of this church.

### GOVERNMENT

#### American Law Institute, Philadelphia

Grant No. 657 (1942), \$5,000. Study of whether the concepts of individual rights in the United States and British Commonwealth of Nations, and among those of liberal thought in the Latin American countries, the countries of Western Europe, Russia, China, and India, are sufficiently similar to make possible the careful expression of these rights in an International Bill of Rights:—if so, to prepare a model draft.

The object of the Institute's work on an International Bill of Rights is to ascertain whether present democratic thought in the principle world cultures is in agreement on the essentials of individual freedom and if so to express these essentials in a clear and as far as practicable concise manner.

The Group of Advisers to which the Institute submitted the problem is composed of representatives or those who speak with knowledge of present liberal thought in all the countries now fighting the Axis as well as those representing anti Nazi, Fascist, and Japanese military philosophy in the Axis countries and those countries now occupied by Germany.

As the result of many conferences of the Group and the work of sub-committees dealing with special topics, there has been prepared a proposed final draft of "Essential Human Rights" containing eighteen articles with appropriate comment. In the first week of 1944 this draft was submitted for final revision to a meeting of all the Advisers.

In connection with the Institute's work a careful study has been made of all analagous provisions in existing or recent constitutions.

The results of this study will be made available to students of comparative constitutional law.

## CLASS IV. HUMANITIES

### ETHNOLOGY .

FAY-COOPER COLE, University of Chicago

Grants No. 575 (1941), \$1,500 and No. 644 (1942), \$1,000. For continuation of collection, preparation, and use of manuscript materials relating to period of contact between Whites and Indians in the Mississippi Valley in the Ethno-History Program.

The objectives of the Ethno-History Program during the first six months of 1943 were a continuation of those described in the YEAR BOOK of the Society for 1942, pp. 193-194.

Since that report was made, a checklist of the Ethno-History Library of published sources has been completed. The Manuscript Map Collection has been classified and housed, and a descriptive index completed. Preparation of Part II of *Indian Villages in the Illinois Country* (Scientific Papers, 2, Illinois State Museum) has continued and it is expected it will be finished in 1944.

Calendaring of collections has continued with particular emphasis placed on the Letterbooks of Governor Lewis Cass from 1814 to 1823. The Calendar for Volume I, Letters Received and Sent, 1814-17, will soon be available for inter-library lending in micro-film.

This grant, which was used to continue the services of Mrs. Sara Jones Tucker, has brought the work in the Ethno-History Project to the point where the Rockefeller Foundation has felt justified in making it a continuing grant over a term of years.

### ANCIENT AND CULTURAL HISTORY

FREDERIC C. LANE, Johns Hopkins University

Grant No. 641 (1942), \$600. Preparation of a volume on the Venetian nobility in the fifteenth and sixteenth centuries.

The sources for the understanding of business methods in the Venetian Republic are especially rich at the beginning of the sixteenth century. A number of account books and collections of letters lie in whole or in part within the period covered also by the

remarkably informative diaries of Girolamo Priuli and Marino Sanuto. These diaries, comparable as sources to newspapers of other periods, greatly aid in evaluating the significance of the various groups of business records. Some of the surviving mercantile papers concern the affairs of two of the persons named by Marino Sanuto as among the ten richest in Venice. Together with these two families, those of Michele da Lezze and Alvise Pisani, two other families of political and economic distinction have formed the center of investigation, those of Giovanni Francesco Badoer and of Girolamo Priuli.

The most interesting facts uncovered during the year by the work I have been carrying on with Dr. Wieruszowski's assistance concern an embryonic sort of joint-stock company called a *maona*. The word is well known in Genoese records of earlier centuries, but its use at Venice in the fifteenth or sixteenth century has not previously been noted. In a paper entitled "Family Partnership in Venetian Business Organization" I have explained the character and function of the Venetian *maona* and its relation to family partnerships. (Plans for its publication will probably be completed in a few months.) The family form of business organization was dominant at Venice, as is well known, and the sources read for me by Miss Wieruszowski during the year add much to an understanding of the way these partnerships operated.

The most extensive collection of letters studied were those from or to Giovanni Francesco Badoer. Many are from agents in Zante, Crete, Constantinople and other parts of the eastern Mediterranean, but the most interesting are those to his brother when the latter was master of a merchant galley in England, 1531-32. Among the topics discussed are the mutiny of the galley crews and the efforts of a certain Matteo Bernardo to control the galleys and so monopolize the import of English wool to Venice. In spite of great difficulty in the reading of some of the most personal of these letters in which the language is familiar and seldom explicit, we have arrived, I believe, at sure renderings of the meaning in nearly all cases and can therefore reconstruct a lively and most revealing attempt at commercial manipulation. The play of personalities drawn from diverse social circles of Venice is not the least interesting part. The Badoer letters are proving valuable in depicting not only the economic activities but also the general interests and attitudes of the Venetian merchant nobles.



KURT PINTHUS, American Council of Learned Societies

Grant No. 705 (1943), \$1,800. Investigation of the holdings in the field of drama and the theater in the Library of Congress.

The "incalculable wealth of theater material" in the Library of Congress of which Gilder and Freedley speak in *Theater Collections in Libraries and Museums, 1936*, has never been investigated. My search for the purpose of examining, surveying, and evaluating the holdings of the Library of Congress in the field of Drama and the Theater, dispersed over nearly fifty different sections, soon resulted in two facts: (1) that these materials are virtually inexhaustible, and (2) that they represent the largest theater library in the world.

The following remarks give only a few highlights of the results thus far, stressing the less known, or unknown materials. The older English Drama in the Library of Congress ranks among the finest collections of this country, containing the Longe Collection of 2105 rare plays, supplemented by many choice items of other groups. The older American Drama will probably excel all other collections of American plays when the tens of thousands of manuscripts and typewritten, mimeographed or privately printed copies of plays in the Copyright Division, Rare Book Room, etc., shall have been thoroughly examined, catalogued, and transferred to the collection of American Literature. The German Drama collection has many rare editions of Lessing, Goethe, Schiller, and others of their times. The modern German Drama is remarkably well represented and was recently further enlarged by about 1500 contemporary plays and the complete library of the last German theater in the United States, in Philadelphia. Here we also find an unusual collection of old Dutch plays produced about 1700, in Amsterdam. The French Drama has been enriched by rare plays and theater material of the 17th and 18th centuries in the famous Raymond Toinet Collection; another collection of about 3000 French plays brought many pieces by authors of the periods of the Revolution, Napoleon, and Restoration. The Slavic Division houses the largest collection of Russian plays outside Russia, as well as a very comprehensive accumulation of books and periodicals on the Russian theater, ballet, and motion picture both under the Czarist and Soviet governments. Besides remarkable material by and on Calderon, Lope de Vega, and other classic dramatists, the Hispanic Foundation contains the largest collection of 19th and 20th century Spanish plays of both

Americas, totalling more than 10,000 uncatalogued items. An unusual treasure is a manuscript of Aztec plays transcribed by Spanish missionaries in 1687. The drama in Hebrew and Yiddish is practically complete in the Semitic Division; the Sanskrit drama has seventy-five percent of all plays ever printed in Sanskrit; China and Japan with about 800 plays each, in the original languages, and much profusely illustrated literature on the Asiatic theater represent the largest collection of this kind outside these countries.

The Library houses the most extensive gathering in the United States of rare old and modern material on the dance, ballet, and pantomime, many choice pageants and masques, a great number of theater periodicals and almanacs, among them almost all American theater magazines beginning with *The Thespian Mirror*, 1805-06. The American film periodicals are complete in the Library, as well as the books on the American motion picture; it also contains practically every motion picture ever produced in the United States, partly in more or less complete scenarios, partly in film reels, including the 5000 earliest American films recently rediscovered. In the Fine Arts Division there are about 2000 colored lithographed posters offering an illuminating picture of America's theatrical entertainment from 1870 to 1900, as well as tens of thousands of unexplored photographs of actors in life and in costume. "Fugitive material" of other kinds is also abundantly to be found, e.g., the very extensive papers of famous actors and actresses like Charlotte Cushman and Jean Margaret Davenport, or diaries, scrapbooks, and letters beginning with the first William Warren about 1800, to Richard Mansfield, Minnie Maddern Fiske, and May Robson. There are groups of playbills and programs, with 2000 playbills of Shakespearean performances given in England 1786-1848, and hundreds of Washington programs.

The Copyright Law provided the Library with about 180,000 entries containing more than 200,000 plays; approximately the same number of plays of all countries and all periods—in single plays, in collected works, and in critical recensions—may have been acquired by purchase and gift, including the world's largest collection of 25,000 opera librettos, a huge accumulation of puppet, children's, and college plays, etc. To these 400,000 items is added an estimated total of 100,000 volumes relating to dramatists, drama, and the theater, including multitudes of books pertaining to the history, theory, architecture, and scenery of the theater, books by and

about theater people, and a large group of old treatises, discussing particularly the moral value of the theater.

The investigation shall be continued because to date only a fraction of the theater material could be thoroughly analyzed. There is, for instance, the complete material of the Federal Theater Project throughout the United States, and the already mentioned tens of thousands of uncatalogued and especially of unpublished plays containing not only many so-called "lost plays" of American authors (ten unpublished plays by Eugene O'Neill, manuscripts by Charles Hoyt, Bartley Campbell, Benjamin E. Woolf, James Steele MacKeye, and many others) but also of dramatists of other countries.

In order that this little known and unknown material shall be made better known and available to scholars, students, and all interested in drama and the theater articles by me are about to appear.

PINTHUS, KURT, 1944. The World's Largest Theater Library. Lib. Cong. Quar. Jour. I: No. 2.

ALEXANDER N. VYSSOTSKY, University of Virginia

Grant No. 465 (1940), \$100. Translation of the astronomical references in the old Russian Chronicles (11th to 17th century A.D.).

The completion of this undertaking, a preliminary report of which was made in 1940, has been considerably delayed for various reasons. The translation of the texts was finished during the summer of 1943, but it was considered inadvisable to attempt to edit it without a more extensive study of the interrelation of the different chronicles. Fortunately, a microfilm copy of Professor Priselkov's research<sup>1</sup> published in Russia in 1940 has been obtained through the libraries of the University of Chicago and this greatly clarifies a rather complicated problem. The chronicles contain records of forty-three solar eclipses, twenty-seven lunar eclipses, twenty-eight comets, eighteen displays of meteor showers and fireballs, two observations of sunspots and eighteen of the aurora borealis. It thus appears that the chronicles recorded only unusual or spectacular astronomical phenomena.

VYSSOTSKY, ALEXANDER N., 1941. Report of Progress. Yr. Bk. Amer. Philos. Soc. for 1940: 269.

<sup>1</sup> History of Russian Chronical Writing in the 11th-15th centuries.

## ARCHAEOLOGY, HISTORY OF ART

HERBERT FRIEDMANN, United States National Museum

Grant No. 724 (1943), \$200. A study of the use, symbolism, and art-historical significance of the goldfinch motif in European devotional art.

One of the most frequently included accessory symbols in the devotional paintings of the Catholic Church is the figure of a small bird, usually held in the Christ Child's hand, but also sometimes placed elsewhere in the pictures. In about seventy percent of the cases where the bird is identifiable to species it is the goldfinch, *Carduelis carduelis*. A careful search of large segments of the literature and of the paintings in many galleries in this country and in Europe has yielded about 500 paintings in which recognizable goldfinches occur. The use of this symbol has been traced through the art history of Italy, Spain, the Low Countries, France, Germany, Austria, and to a lesser extent, Russia. The chronological span involved is from the seventh decade of the thirteenth century to the middle of the eighteenth, but the use of the symbol died out everywhere in Europe save for meaningless, atavistic revivals, by the close of the sixteenth century. The symbol found its greatest use in Italy, where over ninety percent of the pertinent pictures were made. All of the main schools of Italian painting were more or less given to the use of the symbol, and the significant differences between them in this regard have been investigated and pointed out with explanatory suggestions. Likewise, a study has been made of the artists involved and of their several attitudes towards the use and meaning of the motif. Correlated with these studies of the paintings and their painters I have also outlined the use of the motif in manuscript illuminations, in sculpture, and in tapestries. The motif is overwhelmingly one found in paintings; frequent, but often not readily identifiable in sculpture (because of the absence of color); infrequent in devotional, as opposed to mere decorative, illuminations in manuscripts; and rare in tapestries.

The symbolism of the goldfinch is extraordinarily complicated as it was a polyvalent symbol, and as a result of its multiplicity of meanings, the figure tended to be used more frequently for each of these meanings than if it had had but the one involved in each case. In common with other small birds, it was a symbol of the Soul; in common with other small birds with reddish markings it was a

symbol of the Passion, the Crucifixion, and of Redemption. Peculiar to it, and in this respect wholly Italian, was a connotation of Fertility (pictures in which it was included were thought as apt to insure offspring to the donors), and by a long and complicated series of mystical identifications proposed by various medieval ecclesiastics it also came to be a substitute for a long established disease augur. The ravages of the plague, especially during the fourteenth century brought the themes of disease augury and fertility very close together, as a hope for survival, and gave the symbol greatly increased popularity. On the other hand, the multiplicity of meanings tended to obscure the tortuous paths by which the meanings and their origins had to be retraced in the course of the present study. Medieval poems, sermons, and the writings of the Franciscan and Dominican mystics were combed and the data extracted therefrom were aligned with the natural history data of the old bestiaries and the medieval moralized versions of the classic sources (such as Pliny, Plutarch, Aelian, and Aristotle). The history of the plague was also investigated for possible mystical usages pertinent to this study and the results also integrated with the rest of the material.

The manuscript is finished and is now being read by several experts for possible discrepancies in attributions of works of art and stylistic details. The photographic material is now being assembled for the illustrations and about forty percent of it is already in hand.

It merely remains to add that apparently the study of this symbol has never been made before by anyone else; the work has therefore broken new ground and the material collected has yielded much suggestive and interesting evidence not only concerning the pictures in which the symbol appears, but also concerning the collective mentality that was expressed in the five centuries of the greatest period of European painting.

HUGH O'NEILL HENCKEN, Harvard University

Grant No. 351 (1939), \$500. Preparation of illustrations for reports of the Harvard Archaeological Expedition in Ireland.

This work is now completed. The report, Ballinderry Crannog No. 2, has been published in the *Proceedings* of the Royal Irish Academy, Vol. XLVII, Section C, No. 1, 1942. The other, Lagore Crannog, will be published by the Royal Irish Academy ~~when cir-~~ cumstances permit.

Ballinderry Crannog No. 2 was a site excavated by the Harvard Archaeological Expedition in Ireland in 1933. It consisted of two occupation layers, the earlier prehistoric (Late Bronze Age), the later Early Christian.

1. Late Bronze Age Layer. This was a lake-side settlement at Ballinderry Lough, County Offaly, in central Ireland. It consisted of a number of wicker huts and a larger structure with a foundation of oak planks. Bronze implements were in use. The inhabitants kept cattle, pigs, sheep, and goats. They raised grain, though not to a large extent, and they occasionally hunted the red deer. Their occupation was terminated by a rise in the level of the lake, which deposited a layer of mud over the settlement.

The pottery from the site, called "flat-rimmed ware," is found in Britain from the River Humber northward. There it begins in the Late Bronze Age and continues into Roman times. Its focus in Britain is near the Yorkshire coast, and it may represent settlers from across the North Sea. The makers of this type of pottery crossed over from Britain to Ireland, and formed one part of the Late Bronze Age movement between the two countries. This movement may be connected with the spread of Gaelic speech. This settlement dates from about the 4th-3rd century B.C.

2. Later on, Early Christian settlers (8th century) built a crannog or artificial island over the prehistoric settlement. This was defended by a stout circular palisade of posts. The economy of the inhabitants was much the same as that of their prehistoric predecessors except that chickens were now kept. Iron was used in addition to bronze. In general the culture was a combination of prehistoric elements and a few survivals from Roman civilization.

Lagore Crannog in County Meath, another artificial island in a lake, was excavated by the Harvard Archaeological Expedition from 1934 to 1936 as a relief scheme under the Irish Ministry of Finance. The site is of importance because it is mentioned in the Irish Annals as the residence of the kings of Lagore from the latter part of the 8th century A.D. to the middle of the 10th century. In view of the uncertain chronology of Christian sites in Ireland, the vast body of dated objects found at Lagore is of great importance. These include a wide range of gold, silver, and bronze ornaments; iron swords, spears, shield bosses, and slave-chains; utensils of all kinds including many objects of wood and bone; and textiles. The more perishable objects were preserved by the damp soil.

Pottery and a bridle bit found in the substructure of the site showed connections with the western continent and confirm the founding of the crannog in the 8th century as indicated in the *Annals*. Also, nothing was found pointing to a date later than the death of the last king of Lagore in the mid-10th century.

The culture was, like that of the Christian layer of Ballinderry No. 2, composed of prehistoric elements with some Roman survivals and the few continental imports already mentioned. With the exception of a rough cross on the bezel of a ring, there was nothing that could be called Christian. Though only a few miles from Dublin, at that time the seat of the most powerful Viking kings in Ireland, Scandinavian elements are very few. This indicates a minimum of commercial contact with the Dublin Vikings, with whom the kings of Lagore were often at war.

The excavation also gave much evidence of the occupations and pursuits of an early Irish court: bronze-working, iron-working, the making of glass studs for bronze ornaments; the making of millefiori enamel; weaving; the playing of dice-games; and stag-hunting.

The neighboring monastery, a famous foundation in the 5th century, seems to have lapsed until the period of the kings of Lagore. After that it evidently lapsed again for a few centuries. Little now remains of it, but on its site was found a stone lintel with a fine pre-Romanesque sculpture of the crucifixion. Can this have belonged to a church built by the kings of Lagore?

#### HARALD INGHOLT, Buffalo Society of Natural Sciences

Grant No. 652 (1942), \$750. Study of the collections of Syro-Hittite material—stamps and cylinder seals in the Buffalo Museum of Sciences.

The Near East collection in the Buffalo Museum of Science is made up primarily of a loan deposit from a French antiquary who, for a number of years, lived in Syria. The majority of these antiquities are seals, 34 the cylinder type, 139 stamp seals. In addition there are a number of smaller objects: 50 bronzes, 71 terracotta figurines, 18 pieces of pottery, 18 objects of stone, and 2 of bone.

In the spring of 1943 the Museum materially increased the number of its own seals by the purchase of 177 seal cylinders, so that it now possesses a most representative collection of the glyptic art of the Near East.

The seals range in date from the Uruk to the Sasanian time (ca. 3400 B.C.-7th century A.D.), but of the many interesting items I shall here describe but two seal cylinders of the Middle Assyrian period (13th century B.C.).

On one of them a boat floats upon the water. Two wild goats seem to be perched on the upturned prow and stern, and in the center an eight-pointed star rests on a low pedestal. Back of the star a helmsman steers the boat, in front of it a hunter raises a curved stick. Both men are dressed in the costume characteristic of the period: a pointed headdress or helmet, a tunic reaching to the knees with two long tassels hanging from the belt. The other seal likewise displays a unique subject. A bull appears to be suspended upside down in the air, its horns and tail precariously supported by the hands of two flanking male figures of the type generally known as Gilgamesh. The muscles of the bull are admirably rendered, in keeping with the amazing artistic skill of this glyptic category.

As regards the remainder of the collection, one outstanding piece is probably to be dated in the Early Bronze Age, about 2300 B.C. It is a cult image of terracotta, representing a seated goddess, a bowl resting in her lap. A rectangular frame with smaller bowls in each corner surrounds the base of the figure which rests on a tall, flaring stem similar to the so-called champagne-bowls of early Northern Syria.

The majority of the bronzes, the terracottas and stone objects, however, belong mainly to two later periods. One of these is the beginning of the second millennium, when Syria was overrun by Semitic, Indo-European, and Asianic tribes who between 1730 and 1580 even succeeded in conquering Egypt, there being called Hyksos, "Rulers of Foreign Lands." The other is the beginning of the first millennium B.C. when new Semitic invaders, the Arameans dispossessed the former over-lords of the country, the Neo-Hittite tribes, who around 1200 B.C. had tried to repeat the feat of the Hyksos.

Among the objects belonging to the period of invasions preceding the establishment of the Hyksos in Egypt, the most remarkable piece is a jar on the neck of which two small birds face towards a nude, hybrid figure with the body of a man and the head of an ass. Similar figurines are known from Djebel, Morek, and elsewhere in Syria, and probably are the prototypes of the ass-god



which the Hyksos worshipped as their main divinity and identified with the Egyptian god Seth.

The Hyksos were a horse-loving people, chiefly responsible for the introduction into Western Asia of horse-drawn chariots, and it is therefore but natural to identify as a god of theirs the terracotta figurines representing a man on a horse, his body inexpertly fashioned in one piece with the head of the horse.

In the second period, from the beginning of the first millennium, similar figurines are also found among the terracottas, but now the rider is correctly placed on the back of the horse and relief bands on head and neck indicate the trappings of the steed. The god R-k-b-l, the charioteer of El, is repeatedly mentioned in the inscriptions of the period, and our little figurines may very well copy some time-honored image of this equestrian god.

Finally, a small oval seal from the 7-6th century B.C. bears witness of a divinity who was to transcend by far in importance any one of his contemporaries, the Jewish Yahwe. In the abbreviated form, Yah, the name of this god is found in one of the two names engraved in Hebrew characters on the seal: Uzziyah, "Yahwe is my strength"; and it is probably to be understood in the other: Yatom, a possible contraction of Yahwe-yatom, "May Jahwe finish."<sup>1</sup>

CHARLES DE TOLNAY, Princeton, N. J.

Grant No. 672 (1942), \$250. Contributions for the preparation of a *Handbook of Old Master Drawings*. (The book appeared with the title *History and Technique of Old Master Drawings*, New York, H. Bittner & Co. 1943. The first chapter deals with a survey of the theories of drawing and gives more complete bibliographical references.

The following report on the results of this grant was presented in a paper, read by title, at the Autumn Meeting of the Society entitled "Theory of Drawing in Italy and France During the Renaissance and Baroque."

Contrary to the modern approach which considers drawing as a document of the intimate personality of the artist, the theory of the Renaissance and Baroque endeavoured to determine first the

<sup>1</sup> Albright, W. F. Bull. Amer. Schools of Oriental Research, No. 79: 15, note 9 (1940).

fundamental importance of drawing in the hierarchy of fine arts, and secondly, to reveal its metaphysical origins.

The basic theme of the doctrine of the Renaissance is, indeed, that drawing is the foundation of all fine arts and a source from which they all originate. Already, Cennini, guardian of the Giottesque tradition, taking up again the ancient concepts of Vitruvius, wrote about 1400 in his treatise: "The foundation of art, the principle of all these works made by hand, is drawing." This sentence recurs in a more precise manner a few years later in Ghiberti's treatises when he says: "Drawing is the foundation and the theory of these two arts, sculpture and painting."

Drawing thus receives a new dignity just at that moment when the individual is discovered and his personal manner of expression is appreciated for the first time; that is to say, at the moment when modern drawing was created.

About a century later at the beginning of the sixteenth century, the same doctrine, enriched by a somewhat sophisticated argumentation, recurs by Pomponius Gauricus in his work entitled *De Scultura* (1504). He says that drawing is the basis of all the fine arts because the Greek word *γραφείν* is common to them all. In the middle of the sixteenth century we find it again in the work of Fr. da Hollanda (1548) according to whom Michelangelo is supposed to have said: "Painting, sculpture, and architecture culminate in drawing. It is the primary source and the soul of all kinds of painting and the root of every science." And in another place he puts into the mouth of Michelangelo a statement which anticipates the ideas of Vāsari: "If I reflect, it seems to me that there is only one art and science on earth: namely, drawing, from which all the others are derived and of which they are parts." All three fine arts are differentiations of one original art, namely, the *arte del disegno*. This sentence seems to have influenced the theory of drawing of Vasari, the famous historiographer of Italian art and one of the first collectors of drawing in the proper sense of the word, who brought them together not only for purposes of study but also for their own intrinsic value. For Vasari drawing is the father of the three arts, architecture, sculpture, and painting. "Il disegno è padre delle tre arti nostre, Architettura, Scultura, e Pittura." Drawing is for him a primordial art, source of all the others. It is at the same time the most intellectual, since for Vasari "drawing is a visible expression of a concept which is in the mind."

At the beginning of the seventeenth century Cesare Ripa in his *Iconologia* describes the personification of drawing—evidently under Vasari's influence—under the aspect of an "old and hoary father of painting, sculpture, and architecture."

The birthplace of this doctrine of the supremacy of drawing was in Florence and the region where it flourished remained in middle Italy. It is in complete accord with the artistic practice of this school where drawing was considered always as the basis of artistic education and where the predominance of the closed contours was one of the chief elements of style.

When the Venetian school, which excelled through its colorism, attained equal importance with the Florentine there arose differences of opinion about the supremacy of drawing or color. Drawing and color were from now on considered as antithetical notions.

This idea reverts to the Florentine academy which reproached the schools of Venice and Lombardy for their preference for color and their lack of good drawing. Vasari reports in the *Le Vite* (Edition Milanese, Florence, 1878, Vol. 7, p. 447): "Reflecting on the works of Titian, Michelangelo praised them, saying that his colors and his manner pleased him much; but that it is regrettable that in Venice one did not learn to draw well from the beginning." As this sentence shows, Michelangelo's criticism was not at all intransigent. It became a doctrine, however, in the hands of the members of the *Accademia del Disegno* in Florence and served as a justification of the style of the Florentine school and even demonstrated for the Florentine artists its superiority.

In contrast to the Tuscan theorists the Venetian writers believed that drawing is only one part of painting and not at all its foundation. This doctrine appears in the *Dialogo di Pittura* by Paolo Pino published in Venice in 1548.

In the 17th century, as the center of artistic theory shifted from Italy to France, the doctrine of the antithesis of drawing and color spread also to the northern countries. It appeared first by a Dutch writer, Franciscus Junius, a friend of Rubens and Van Dyck. In his *De pictura veterum* published in Amsterdam in 1637 he expressed some twenty or thirty years before the French academicians their doctrine that drawing must be predominant: "It is drawing, when it is not hidden under the disguise of the colors, which makes us see clearly the laws of perfect proportion." Here we have

drawing and color considered again antithetical notions. The same idea recurs by Du Fresnoy, a friend of Poussin, in his *De Arte Graphica* (written between 1641-1665). Colorism is for him merely a *complementum graphidis*. Félibien also confirms the superiority of drawing when he says in his *Des principes de l'Architecture, de la Sculpture, de la Peinture*, Paris, 1676 "One must not doubt that this part is the first and the most essential of painting." The man who upheld in a most intransigent manner this doctrine was Charles Le Brun, the omnipotent dictator of the French Academy: "Drawing should be always the pole and the compass that directs us . . . that we may not be submerged in the sea of color in which many people are drowned trying to save themselves." Here drawing is identified with "reason," color with "irrationality." One is a virtue; the other, a vice. So the French Academy identified itself completely with the Florentine doctrine. It was the outsiders, the independent artists and the amateurs who justified color. We find the opinion expressed in the works of Félibien and Rogier de Piles that Titian and Rubens should be appreciated as much as are Raphael and Michelangelo.

Artists and amateurs divided themselves in France in the second half of the 17th century into two camps, the Poussinists (draftsmen) and Rubenists (colorists) and disputed the relative value of one over the other. This is no more the struggle of two local schools as it was in Italy; rather is it the struggle between traditionalism and progressivism. In the 19th century these two camps still persisted and its greatest representatives were Ingres and Delacroix, until Rodin bridged the antithesis between color and drawing when he said: "One cannot admire one without the other, for they are but one."

To sum up, the doctrine of the supremacy of drawing originated in Florence in the period of the Renaissance and served a practical end to justify ideologically the superiority of the Florentine style over the north Italian (Venetian). If one realizes that all the writers of these treatises were themselves artists, one understands that this doctrine was a product of the struggle of artistic life. But in France in the 17th century the struggle became sublimated to a true ideological battle. It is the antinomy of two artistic convictions—the traditionalists or reactionary artists on the side of drawing, the progressive or revolutionary artists on the side of color.

The other fundamental doctrine of the theory of drawing of the Renaissance was its spiritual origin. Its birthplace is in Florence in the middle of the sixteenth century. In contrast to the earlier theoreticians who were concerned only with the manual execution of drawings, Vasari was the first to give a description of the spiritual processes in the creation of a drawing. This creation of drawing evolves out of the interplay of intellect and observation, or human spirit and nature. According to Vasari, drawing originates in the intellect in the form of a *concetto*, that is, an inner image inspired by a contemplation of nature. The sensual experience and the spiritual abstraction are both, according to his theory, factors of equal importance in the creation of a drawing. In this balance may be recognized the tradition of the aesthetics of the High Renaissance: "Drawing . . . proceeding from the intellect draws from many things a universal judgment similar to an idea . . . from this knowledge is born a certain concept and in the mind is formed that certain thing which then expressed by the hands is called drawing; one can conclude that this drawing is nothing else than an apparent expression of the concept which is in the mind" (Op. cit., vol. I, p. 168).

But already the theoreticians of the next generation, although strongly influenced by Vasari, had shifted their accent: the sensual experience (*la cognizione* of Vasari) is no longer considered the source of the intellectual *concetto*, and the drawing is now defined as "a speculation born in the mind and an ingenious ability of the intellect." This definition of Armenini (1587) is similar to those of Borghini (1584) and Lomazzo (1584). Here the High Renaissance balance between experience and intellectual abstraction is supplanted by pure intellectualism. The notion of drawing is completely spiritualized and at the same time uprooted. On this foundation is erected, just at the beginning of the 17th century, the philosophy of drawing by Federigo Zuccari, as expressed in his *Idea dei pittori, scultori, et architetti* (Turin 1607). He says that drawing is of divine origin, a gift of God's grace. Following in Vasari's footsteps, but expressing himself even more concisely, he distinguishes "il disegno interno" from "il disegno esterno." In the inner drawing, that is to say, in the inner image which the intellect needs in order to realize the external form, Zuccari recognizes the Platonic idea, the *forma sine corpore*, which in its purest form re-

poses in God: "By inner design I understand the concept formed in the mind to be able to know anything whatever and to work exteriorly conforming with the thing understood." In another place he says "Inner design is an idea and form in the intellect expressly representing the thing understood." Inner drawing is therefore the basic faculty of the mind which is necessary for all understanding and creation. For Zuccari it is a universal notion which surpasses the limits of artistic creation. Drawing is a scintillation of the divinity ("scintilla della Divinità"). "We are all draftsmen," he says, "in the eyes of the Lord. All of us have an inner idea in whatever art or science we are concerned. But a transposition of inner design into the exterior form is the peculiar gift of the plastic artist." In Zuccari's "theology," inner drawing is a purely spiritual thing, a direct expression of the intellectual idea; and, since this idea originates in God, this theory gives a metaphysical explanation to the consideration of drawing as a primordial art. Consequently for Zuccari *disegno interno* does not have the same meaning as it does today: namely, the intimate thought of the artist. It is for him the *forma spirituale* of the finished work, not its embryonic preparation.

Italian theoreticians of the 17th century have added almost nothing to this philosophy of drawing. The most important among them is Giovanni Pietro Bellori, a friend of Poussin. In his *Vite dei pittori, scultori, et architetti* (1664) he repeats the metaphysics of Zuccari, reconfirming the superiority of the idea, or as he calls it, *fantasia*, over nature. He says: "The noble painters and sculptors, imitating that first Maker, also form in their minds an example of superior beauty, and concentrating on it, correct Nature without a fault in color and in line . . . Phidias . . . won admiration by having imitated the idea rather than Nature." He concludes, "Fantasy makes the painter wiser than does imitation."

This doctrine of the origin of drawing spread in the 17th century to France. It is, however, characteristic that the country which gave even to the Baroque style a touch of classicism, did not take over the last abstract-spiritual version of the doctrine of Zuccari and Bellori but that it reverted to the more conservative definition of Vasari.

The sentence of Félibien "Design is an apparent expression or a visible image of the thoughts of the mind and of what one has

formed first in his imagination'' is almost an exact translation of Vasari's definition. Even more characteristic for the French aversion to the abstract metaphysical doctrine is the advice which Du Fresnoy gave to the artists in his *De arte graphica* in which he rectified the doctrine of the divine origin of drawing, reestablishing balance between artistic idea and nature. He says: "Do not be so strongly attached to Nature that you do not value your studies or your Genius, but also do not believe that your Genius and the memory alone of things you have seen furnish you enough (material) to make a fine painting without the help of this incomparable teacher Nature, which you must always have present as a witness of Truth."

The doctrine of the divine origin of drawing served to the Italian artists as an argument in their social struggle to be considered as a spiritual élite. Indeed, this doctrine was created and fully developed at the time when Italian artists had emancipated themselves from the spirit of the guild, and when they no longer wanted to be considered as craftsmen but as free creative geniuses. In their writings they sought to justify by the above metaphysics their higher faculties and to demonstrate philosophically the right for the new position in the social hierarchy.

When the idea came to France in the 17th century this doctrine served no more as an argument in the social struggle, but was sublimated. For this reason we find in France the "theory of genius" of the mannerism suppressed and the theory of nature as chief source of inspiration reinstated.

To sum up, the doctrine of drawing was created in the artistic and social struggles of Italy during the late Renaissance. Then as the theory was transplanted in France, it became spiritualized, but it was only supplanted by a new theory in the 18th century, as the most important writers on art were no longer professional artists, but amateurs and men of letters. Instead of trying to justify the style of a particular School or the social position of the artist, they attempted to understand drawing as a manifestation of the intimate thought of the masters. The first to accept this point of view based on the appreciation of the subjectivity of the artist was Conte de Caylus whose "Discours sur les Desseins" given in the Académie Royale in Paris in 1732 opened a new period in the history of the theory of drawing.

## LANGUAGES AND LITERARY HISTORY

CHARLES ROBERTS ANDERSON, Johns Hopkins University

Grant No. 686 (1943), \$2,000. Preparation for publication of the Centennial Edition of the Works and Letters of Sidney Lanier.

The following report on the results of this grant was presented in a paper read at the Autumn Meeting of the Society entitled "The Centennial Edition of Sidney Lanier."

The impulse which set in motion the present edition was the discovery, on the eve of Lanier's centenary in 1942, that his family had preserved an extraordinarily large collection of his manuscripts, letters, and other memorabilia, and that these were now for the first time to be made accessible to scholars. When there was added to this a generous subsidy by an anonymous donor, the long-needed scholarly edition of Sidney Lanier became a feasible project.

Existing editions of his writings are wholly inadequate. To begin with, his works have never been issued in a uniform set, and none of them have been edited by scholars with introductions and notes. And all of his volumes, with the single exception of his poems, have long been out of print and are rarely known except to the special student. Only one thin volume of his letters has been brought before the public. Of his prose, only three volumes were published during his lifetime, and since they were never reprinted they have become collector's items. Four more were issued posthumously; but two of them—collections of his lectures—were badly garbled texts, and the other two—comprising a score of his essays—were sadly incomplete since they left more than half of his ventures in this field still uncollected. Of his poems, only ten were published in final book form during his lifetime; one hundred more were added to a "collected" edition after his death, transcribed with varying degrees of accuracy from periodicals and manuscripts; another score are uncollected; and still another score remain in manuscript. Hence the available texts for over half his works are not authoritative; the very existence of many of them is not known; and a small but interesting body of poetry and prose plus a large collection of previously unknown letters remain in manuscript, unpublished to this day.

Before the editorial staff could be selected, a preliminary survey was necessary to fit the material into volumes of reasonably uniform size and congruous subject matter. The initial volume was



allotted to the poems. But the five major prose works, which should logically form the staple of five separate volumes, varied in length from 60,000 to 140,000 words. And this left forty-odd essays to be fitted in somewhere, since they had no compelling *raison d'être* as a separate volume. After considerable juggling, however, they were shaken down into categories suitable for inclusion with the shorter major works—essays dealing with the South, with music, with literature, etc. Each of the volumes now planned required special qualifications in the editor to be selected. For example, Lanier's *Science of English Verse* called for a specialist in music and metrics, with particular knowledge of the middle ages and the renaissance. Six scholars chosen from the country at large responded to the call, and the editorial staff was made up: one associate for each of the volumes of prose and one for the volumes of letters, with the general editor assuming the special task of the key volume of poems. The bibliography was assigned to the last volume of the works; the general index to the last of the letters. By the autumn of 1941 the organization was complete and the real work began.

The initial problem was to sort and catalogue the three large collections of Lanieriana deposited by the family at The Johns Hopkins University. The first step was to separate the chaff from the wheat and to impose some sort of order on the chaos that reigned in the various boxes and trunks of material. Some idea of the magnitude of this task may be gained from the following tabulation of the total collections: the original manuscripts of the bulk of Lanier's prose and poetry, sometimes existing in several versions; more than three thousand letters by, to, and concerning Lanier; several hundred volumes from his library, many with marginal annotations; innumerable clippings from newspapers and magazines; and countless boxes of memorabilia of all sorts: receipted bills and cancelled notes, concert programs and original musical compositions, photographs and manuscript reminiscences, literary notebooks and locks of hair. The chaotic state of these materials can only be hinted at here. The several parts of one item would be found in as many different boxes, to be pieced together by internal evidence. A previously unknown composition would turn up at the bottom of a box of newspaper obituaries. Baffling fragments survived that could never be identified.

A number of the manuscripts of Lanier's poems turned out to be

in another's autograph; and in determining their authoritativeness as texts it was necessary to discover whether they were original dictations to an amanuensis during illness or posthumous copies from magazine printings. Others were first drafts in pencil, well-nigh illegible because of interlinear emendations. Finally, a large mass of jottings and outlines for poems, scribbled on the backs of envelopes and the fly-leaves of books. A selection of these has been gathered as an appendix to the volume of poems, constituting a sort of running poetic journal or work-book.

Besides numerous minor difficulties connected with the manuscripts of Lanier's prose, one major problem threatened to remain unsolved and invalidate the text of an entire volume: his lectures on Shakespeare. At the last stage of despair, a list of the contents of two different sets of lectures was discovered, made out by some assistant to the former editor before they were coalesced. With this key they readily fell apart into a clearly recognizable series of popular lectures delivered at Peabody as distinguished from the more scholarly series at Hopkins.

The greatest trouble came from the letters. From some the signature had been clipped for autograph collectors, so that the writer could only be conjectured from the contents. Others were addressed simply to "My Darling," which might turn out to be Lanier's mother, his sister, his wife, a devoted friend, or his brother! And of course the fragments without signature or salutation were particularly baffling. But the biggest problem was trying to date the undated ones, of which there were more than a hundred. The evidence of the associated envelope was not always reliable, for some had been misplaced; nor was it complete, for post-marks rarely indicated the year in that period. Nor could they be dated in every case from the contents—especially in Lanier's letters to his wife which, after marriage as well as before, frequently soared clear of all mundane fact. In some cases it was not until after the whole sequence of dated letters had been established that a troublesome waif could be fitted into its niche. And a few have had to go to press with a question mark in the mind of the editor larger than any in the printer's font.

While the general editor supervised the cataloguing of the collections, the associates began the task of preparing printer's copy for the five volumes of prose. The authoritative text was established by the rule of thumb as "that text which last passed under the eyes

of the author and met with his approval"—whether it be found in book, periodical, or manuscript. This text was followed *verbatim* except that typographical errors were corrected, with explanatory footnotes. But it was not followed *literatim*, since there could be no purpose in preserving for posterity the mechanical idiosyncrasies of various printers or the careless errors of unrevised manuscripts. Hence all mechanical inconsistencies were regularized, with a prefatory statement of procedure. Finally, a "complete" edition was decided against, since this would have entailed printing a hundred pages of journalistic hack-work and several hundred of college compositions and speeches. Such items were merely listed by title. The same rules were applied to the volume of poems, except that the small bulk here made it feasible to reproduce everything, including juvenilia and even fragments in an appendix and full variorum readings in the notes. Thus the Centennial Edition, though technically only "collected," is virtually a complete edition of the poetry and prose.

A somewhat different policy was established for the letters. In the first place they are being reproduced from the original manuscripts except in the few cases where these have not survived; and the aim is an absolutely literal text, with the intention of reproducing their true casual quality as well as may be done in print—and without the obtrusive *sic*. But a survey of the whole body of Lanier's letters resulted in the rejection of a complete edition in favor of a selected edition, printing only those necessary to a complete narrative of his inner and outer life. In this way nearly five hundred letters were omitted as too brief to be of any value or because they duplicated matter contained in other letters, any isolated facts not so duplicated being dropped into footnotes. Regardless of value, however, every previously printed letter was included, since the earlier texts were inaccurate or incomplete. Finally, in addition to 1000 letters by Lanier, about 100 to him have been included to fill the gaps in his own narrative. A Calendar at the end of Vol. X will list all known letters, with an indication of the location of the manuscripts and an asterisk to mark those that are printed in the Centennial Edition.

The next problem was footnotes. For the six volumes of works these were limited to textual and bibliographical problems—including significant variants, typographical errors and *lacunae*, and the identification of literary allusions and quotations. Footnotes to

the titles gave concise histories of the composition and publication of the various pieces. Additional footnotes in another category were added for the letters—explanatory matter of all sorts to identify contemporary persons and events, clarify allusions, and fill in gaps in the narrative.

In the introductions, because of the differing problems in the various volumes, the rule for uniformity was limited to the type of problems to be treated and the general method of treating them. For the five volumes of prose, they will contain a history of the composition, publication, and reception of the major work; an account of the authoritative text, the variants, and the manuscripts; and an explanation of any editorial procedures peculiar to each volume. Further, they will relate the specific work to the corpus of Lanier's writings and to the facts in his life—especially by cross-reference to the new matter in the letters. In the volumes of poems and letters will be added a general survey of Lanier's poetic and epistolary careers. Finally, though the aim is primarily expository, general critical estimates will be included.

In conclusion, it should be added that all the customary efforts have been made to bring into play all the available evidence. The major libraries and private collections of the country have been combed, and the descendants of Lanier's principal correspondents have been sought out to supplement the family collections at Hopkins. And every clue that turned up in the letters to an unknown Lanier item has been tracked down. Now, after two years of co-operative labor, and with the aid of a generous grant from the American Philosophical Society, nine of the ten volumes are in galley proof, and the prospects seem favorable for an early publication of the entire Centennial Edition of the poetry, prose, and letters of Sidney Lanier.

EDWARD C. ARMSTRONG,<sup>†</sup> Princeton University

Grant No. 620 (1942), \$2,000. Study of Medieval French and Spanish poems about Alexander the Great.

No critical edition of the Roman d'Alexandre existed previous to the one undertaken recently, yet this Old-French romance, which recounts in legendary fashion the life of Alexander the Great, is fully as important as the other three great "romans d'antiquité,"

<sup>†</sup> Deceased.

the *Roman de Thèbes*, the *Roman d'Eneas*, and the *Roman de Troie*. As written in the ninth decade of the twelfth century by Alexander of Paris, the *Roman d'Alexandre* is a poem of nearly sixteen thousand lines which comprises four parts or "branches" ("branch" being the medieval term for part).

Branch I deals with the childhood and early exploits of the hero; it is ultimately derived from a much older poem written in Southern France by Alberic of Pisançon.

Branch II is mainly concerned with the siege of Tyre and represents the reworking of an earlier poem by Eustache, the *Roman du guerre de Gades*.

Branch III narrates the conquest of India and is likewise based on a previously independent poem, the work of Lambert le Tort of Châteaudun.

Branch IV tells of the poisoning of Alexander and is presumably derived from a poem called the *Chanson d'Alexandre*.

None of the older independent poems (*Alberic*, *Eustache*, *Lambert*, and *Chanson*) has survived in its original form, except for the beginning—a fragment of 105 lines—of Alberic's poem, but their contents may be surmised from an analysis of Alexander of Paris' *Roman d'Alexandre* and, in the case of Alberic and Lambert, from that of an embryonic *Roman d'Alexandre* which stands midway between the episodic poems of the beginning and Alexandre of Paris' later cyclic poem. This embryonic *Roman d'Alexandre*, which contains only branches I and III, is found in manuscripts *A*, *B*, and *L*.

The program involves the constitution of the text of Alexandre of Paris' poem from the some thirty manuscripts and fragments still extant, the publication of the *ABL* archetype, and the restoration of the contents of the early episodic poems (*Alberic*, *Eustache*, *Lambert*, *Chanson d'Alexandre*).

It is planned that the results of this program be published in eight Elliott Monographs (EM) as follow:

Volume I (EM 36): text of manuscripts *A* and *B*.

Volume II (EM 37): text of Alexander of Paris' *Roman d'Alexandre*.

Volume III (EM 38): notes and variants to Branch I, including a critical text of Branch I based on manuscript *G* (in volume I, the text is based on manuscript *M*; since the other three branches use *G* as base, it has been decided for the sake of uniformity to offer a supplementary text of Branch I likewise based on manu-

script *G*) and preceded by an introduction containing the following material:

1. Branch I, a definition; evolution of the material from Alberic down to the *L* redaction.
2. Alberic of Pisançon: text of the extant fragment followed by a reconstruction of the lost part of the poem.
3. A discussion of the *ABL* archetype; text of the *ABL* archetype corresponding to Branch I.
4. Alexander of Paris' Branch I; date of his *Roman d'Alexandre*.
5. Text of Branch I as found in manuscript *L*.

Volume IV (EM 39): Eustache's *Roman du guerre de Gadres*.

Volume V (EM 40): notes and variants to Branch II.

Volume VI (EM 41): notes and variants to Branch III, preceded by an introduction containing the following material:

1. Branch III, a definition; evolution of the material from Lambert le Tort down to Alexander of Paris.
2. An outline of the lost poem of Lambert le Tort (*Alexandre en Orient*).
3. Text of the *ABL* archetype corresponding to Branch III.
4. Alexander of Paris' Branch III.

Volume VII (EM 42): notes and variants to Branch IV.

Volume VIII (EM 43): glossary, table of proper names, general index.

Volume I, II, IV, and V have been published.

With the aid of this grant the service of Dr. Alfred Foulet was secured. During the academic year 1942-43, the manuscript of Volume III was put in final shape for the printer, an important work being the textual constitution of Branch I with manuscript *G* as base.

JAMES A. GEARY, Catholic University of America

Grant No. 685 (1943), \$500. Completion of the preparation of a phonemic text, with translation, of a Fox Indian manuscript written in the current Fox syllabic script, which narrates the complete story of Wisahkâha, the traditional Culture-Hero, Trickster, and Dupe of the Fox mythology.

This work was begun in 1941 with six weeks' fieldwork financed by the residue of Grant No. 165 (1937) [awarded for the study of

the Algonkin dialect of Western Quebec] plus Grant No. 542 (1941) for this specific project. It was continued with three months' field-work in 1942 supported by Grant No. 630 (1942). In these two periods about three fifths of the manuscript was transcribed phonemically and translated. In 1943, aided by Grant No. 685 for the completion of the project, I spent twelve and a half weeks in Tama, Iowa, and finished the transcription and translation of the text. A large amount of ethnological and grammatical notes has been accumulated, including a series of verb-forms not hitherto published.

SAMUEL NOAH KRAMER, University Museum, University of Pennsylvania

Grant No. 42—Johnson Fund (1942), \$6,000. (\$3,000 from 1942 budget and \$3,000 from 1943 budget.) Copying of Sumerian literary tablets and fragments and reconstructing and translating the Sumerian literary compositions.

In the course of the past year, the volume entitled *Sumerian Mythology*, soon to appear as a MEMOIR of the American Philosophical Society, Volume XXI, was expanded to include a chapter of notes, and twenty-four plates of illustrative material; these added features will be of considerable value to scholar and layman.

One of the more important literary works of the Babylonians, the Semitic people who vanquished the Sumerians and became the dominant group in the land once known as Sumer, is the creation epic *Enuma elish*. Because of the Sumerian names of most of the protagonists, and because much of Babylonian culture was known to depend on the preceding Sumerian culture, it had long been suspected that much of the epic goes back to Sumerian sources. However, because of the lack of pertinent Sumerian material, no adequate approach to the problem and its solution was possible. As a result of my intensive study of the Sumerian mythological compositions with the help of the new material from the University Museum, this situation has now been considerably remedied. In a critical review of Alexander Heidel's *The Babylonian Genesis* (Chicago, 1942), the more important cosmological concepts of the Sumerians were outlined. These were then compared with the creation concepts revealed in the Babylonian *Enuma elish*, and both similarities and differences were noted. The review concluded with a comparative analysis of the plot structure of the Babylonian epic

with that of two Sumerian poems involving the destruction of Kur; these were shown to have provided the Babylonian poets with much of their plot material.

In the course of this year, a transliteration and translation were prepared of a brief but highly important Sumerian literary passage taken from a long Sumerian epic entitled *The Epic of Enmerkar*. The translated passage presents for the first time the Sumerian concepts of man's golden age, when fearless and unrivalled, he lived in a world free from war and want. In addition it clarifies to a considerable extent the size and geography of the world as known to the Sumerians of the third millennium B.C. Finally, it indicates that the Sumerians, like the later Hebrews, believed in the existence of a universal tongue and universal faith prior to the period of the diffusion of languages.

The major task of the year consisted of completing the copying of eighteen tablets and fragments in the University Museum, which deal with the Sumerian hero Gilgamesh. By piecing together the contents of this new material with those of (1) twenty-seven tablets and fragments published by various scholars in the course of the past forty years, (2) three Nippur pieces copied in Istanbul, which will appear in my forthcoming *Sumerian Literary Texts from Nippur*, (3) a tablet in the Yale Babylonian Collection whose contents I was generously permitted to transliterate, the preserved portions of the texts of five Sumerian epic tales dealing with Gilgamesh were reconstructed. These are: (1) Gilgamesh and Huwawa (approximately the first 180 lines of the poem are preserved); (2) Gilgamesh and the "Bull of Heaven" (less than 100 lines, and many of these incomplete, are preserved); (3) The Death of Gilgamesh (about 100 lines from the middle, and perhaps the last 42 lines, are preserved); (4) Gilgamesh and Agga of Kish (the complete text, 115 lines, is preserved); (5) Gilgamesh, Enkidu, and the Nether World (over 250 lines, almost the entire poem, is preserved). The scientific edition of these poems, consisting of a transliteration, translation, and commentary, and including copies of the new material in the University Museum, is now in the process of preparation under the title "Sumerian Tales of Gilgamesh." This study, it is hoped, will constitute the first part of *Sumerian Epic Tales*, the second volume of the contemplated series on Sumerian culture.

The work on the "Sumerian Tales of Gilgamesh" led to the preparation of a long study entitled "The Epic of Gilgamesh and



Its Sumerian Sources," to appear in the forthcoming number of the *Journal* of the American Oriental Society. The Epic of Gilgamesh is the longest, and all in all, the most significant literary contribution of the Babylonians. As in the case of the creation epic, it had long been suspected that this Epic of Gilgamesh goes back to Sumerian sources. But because of the lack of much of the pertinent Sumerian material, no trustworthy attempt at a clear and definite statement was possible. The study "The Epic of Gilgamesh and Its Sumerian Sources," undertakes to formulate the problem and outline its solution. By comparing in considerable detail the contents of the Babylonian epic with those of the Sumerian tales of Gilgamesh, it comes to the following conclusions:

1. There is no Sumerian original for the Babylonian Epic of Gilgamesh as a whole. The Sumerian poems vary considerably in length, and consist of individual, disconnected tales, totally unrelated to each other. The plot structure of the Babylonian epic, in which the several episodes are so modified and interrelated as to form a reasonably integrated unit depicting the forceful and fateful drama of the restless, adventurous hero and his inevitable disillusionment, is definitely a Babylonian, rather than Sumerian, development and achievement.

2. The following episodes in the Epic of Gilgamesh can be traced directly to Sumerian sources: (1) The Huwawa episode (Tablets III-IV of the epic); (2) The "Bull of Heaven" episode (Tablet VI of the epic); (3) portions of the "quest for immortality" episode (Tablets IX and X); (4) the "deluge" story (Tablet XI).

3. Even in case of those episodes which lack Sumerian counterparts, most of the detached, individual motifs reflect Sumerian epic and mythic sources.

4. In no case, however, neither in the episodes as a whole, nor in the individual motifs, do the Babylonian poets copy slavishly their Sumerian originals; in practically all cases they so modify their content and mold their form in accordance with their own temper and heritage, that only the bare nucleus of the Sumerian prototype remains recognizable. In a very deep sense, therefore, the Epic of Gilgamesh may be truly described as a Semitic creation.

The study "The Epic of Gilgamesh and Its Sumerian Sources" concludes with an analysis of the contents of the Sumerian poem Gilgamesh, Enkidu, and the Nether World, which clarifies at long

last the major difficulties in the so-called "twelfth" tablet of the Babylonian epic, difficulties in text and meaning which have persisted for more than half a century. In addition, this analysis proves beyond all doubt that the "twelfth" tablet is an inorganic appendage attached to the Babylonian epic whose first eleven tablets constitute a reasonably well-integrated unit. (The part of the study described in this paragraph was read before the American Oriental Society in the spring of 1943.)

- KRAMER, SAMUEL NOAH, 1943. Report of Progress. Yr. Bk. Amer. Philos. Soc. for 1942: 201-203.  
 — 1943. Critical Review of Alexander Heidel's *The Babylonian Genesis*. Jour. Amer. Or. Soc. 63: 69-73.  
 — 1943. Oldest "Book" Catalogue. Univ. of Penna. Library Chronicle 11: 5-14.  
 — 1943. Man's Golden Age. Jour. Amer. Or. Soc. 63: 191-4.

WOLF LESLAU, Ecole Libre des Hautes Etudes, New York

Grant No. 671 (1942), \$1,200. Preparation of a *Guragué (South-Abyssinian) Dictionary*.

Guragué is a South-Ethiopic language for which about twelve dialects are known, some of them by name only, and the others by very insufficient studies. For the most important of them, the Chaha, 2000 words have been collected by d'Abbadie, the author of an *Amharic (Abyssinian) Dictionary*; the manuscript is in the Bibliothèque Nationale of Paris. The beneficiary of the grant undertook the publication of this manuscript including also the words from the other Guragué-dialects in order to give a complete description of what we know about Guragué. Every word is explained etymologically and compared with that of the other Ethiopic languages.

LESLAU, WOLF, 1943. South-East Semitic (Ethiopic and South-Arabia). Jour. Amer. Or. Soc. 63: 4-14.

GEORGE STEINDORFF, North Hollywood, Calif.

Grant No. 687 (1943), \$1,200. Preparation of a Coptic Grammar in English.

The undertaking of a new Coptic Grammar consists in the presentation of the final development of the Old Egyptian Language from the copious material collected by me in the course of many

years of research. The editorial work proper, begun already in 1942, progressed substantially during the year of 1943.

The new Grammar proposes to be more than a mere description of the Egyptian Language in its ultimate phase. Through comparative treatment, it is going to present the historical development of the language of the Second Century A.D. as it evolved from the Old Egyptian, but without neglect of its primary purpose to be a Handbook for the apprentice studying Coptic.

The grammatical material previously gathered by me has been augmented through the study of more recent publications, particularly the Mani Texts written in the heretofore but little known Asyutic (Sub-Akhmimic) dialect. Furthermore, I have endeavoured to embrace in the scope of my research the Demotic phase of Egyptian based upon Spiegelberg's *Demotische Grammatik* and the publications of F. Ll. Griffith and Sir Herbert Thompson.

Up to early December 1943, the following parts of the manuscript were virtually completed, although certain gaps remain to be filled as the work progresses:

The titles of the parts completed and the approximate number of paragraphs are (1) Introduction 6, (2) Phonology 80, and (3) Morphology 220. Part 3 is divided into (a) pronouns and nouns, (b) the verb and (c) particles.

Of the Syntax to which I have set my hand, one important part, the presentation of the Form of Sentences, is also completed (in 90 §§). In the Syntax I employ a new method by giving consideration to the underlying Greek syntax which has essentially influenced the Coptic. I have reached here the results briefly summed up by Alan H. Gardiner in his *Egyptian Grammar* (Suppl. p. 1) that the Coptic Syntax is largely dependent, particularly as regards word order, on the Greek version of the Bible.

As an excursus to the Phonology, a chapter entitled "The Egyptian Alphabetic Signs and their Sound Value" has been written (90 manuscript pages). Here as well as in the Phonology of the Grammar (pronunciation of Coptic) consideration has been given to the basic phonetic research work of W. H. Worrell, *Coptic Sounds* (Ann Arbor, 1934).

As Prolegomena to the Coptic Grammar, an extensive treatise entitled *The Beginnings of Coptic* has also been completed (60 manuscript pages). It consists mainly of a re-investigation of the

problem concerning the originators of the Coptic Language and its Character. The result obtained is that Coptic as presented in the translations of the Holy Scriptures, the Coptic Christian literature, and also in the writings of Shenute, is not to be considered a direct residue of the Egyptian common speech of the First or Second Century A.D. but a literary language ("artificial language," Gardiner) constructed upon the basis of the popular language by grammatically erudite Egyptians who knew Egyptian and Greek, and not by "Coptic scribes who were not burdened with any grammatical knowledge of their speech." This language, in turn, has then influenced the entire Coptic literary production of the ensuing centuries and likewise the common language as presented by numerous private texts.

In close connection with the Coptic Grammar I am further engaged in continuing the compilation of an Etymological Coptic-Egyptian Dictionary to serve as a complement to the *Woerterbuch der Aegyptischen Sprache* by A. Erman and H. Grapow (Leipzig, 1926-31, 5 vols.) and W. E. Crum's *Coptic Dictionary* (Oxford, 1929-39). This progressive collection consisting of "slips" has been greatly improved and augmented by numerous items, during my work in 1943.

### MUSIC

SAMUEL PRESTON BAYARD, Allston, Mass.

Grant No. 707 (1943), \$1,000. Collection of folk song and music in Pennsylvania.

In these investigations the endeavor was to begin where previous collecting work had ceased a few years before—in Greene County, Pennsylvania—and to extend the work into other counties in the southwest of the state. Field work from July to late November 1943 consisted of trips into Greene, Washington, and western Fayette and Westmoreland Counties. Only material belonging to the folk song and music tradition of English-speaking settlers was sought. This is the dominant tradition in southwestern Pennsylvania, as elsewhere, though here some musical influence from Germany may be discerned. Folk song and music repertoires of other groups (Poles, Slovaks, Magyars, Croatians, etc.) certainly exist. As they have not been collected or studied, their bulk and social importance cannot be estimated.

Eleven trips—not all of them successful—were made, and 189 items in all collected, together with pertinent data about their history in local tradition and the background of the informants. The collectanea consisted of 88 folk song items (text and tune, or, in a few cases, tune only) and 101 folk instrumental airs. These findings make it possible to speak with more certainty concerning the local tradition of southwestern Pennsylvania; furnish more data for comparison with local traditions recorded elsewhere; and provide a better basis for working theories—pending further investigation—concerning the nature and significance of this local tradition in comparison with those in other parts of North America.

Experiences on these field trips made one positive and conclusive statement possible: *viz.*, that this sort of popular lore is rapidly disappearing in Pennsylvania. On the whole, the folk songs now prove scarcer than the instrumental tunes; but both are on the edge of extinction due to the same immediate cause, *i.e.*, that a break in the tradition has occurred. The people who now remember these things are the last who will do so, because they have no imitators or disciples among their juniors. Consequently, no one is learning the lore for perpetuation.

Other information furnished by the data from southwestern Pennsylvania may be summarized as follows: We have

1. Further evidence of the one-time vigor of folk tradition in Pennsylvania, and the activity with which folk singing as an art was cultivated.

2. More indication that the song and music repertory of the folk performers was both abundant and varied.

3. Further evidence of combined northeastern and southern elements in Pennsylvania folk song (negro influence appears to be very slight).

4. Indication that industrialism does not—any more than the spread of literacy—necessarily effect a rapid disappearance of the lore of agrarian communities. Most of the folk song items, and a large proportion of the instrumental tunes, came from highly industrialized western Fayette County, and were obtained from industrial workers.

5. Additional evidence that a very large number of the songs and tunes traditional in Pennsylvania form part of a folk repertory known all over the country.

6. Further evidence that American fiddlers possess a number of

tunes untraceable outside this country. The origin of many individual dance tunes remains a problem, although their style of composition is plainly that of the Anglo-Irish dances and marches. The great variation in the versions of such tunes as can be traced to the British Isles makes it dangerous to form hasty opinions about the extent of native American contribution to our store of folk instrumental music. A few tunes are plainly modern and doubtless of American, if not local, composition. With others, creation may have consisted either in the making of independent melodies, or in bit-by-bit modifications of older tunes out of all resemblance to their imported British or German forms. At any rate, present evidence plainly indicates that American instrumentalists have been highly re-creative in their handling of inherited melodic material.

HANS NATHAN, Boston, Mass.

Grant No. 692 (1943), \$500. Preparation of a historical account of the music of Daniel Decatur Emmett.

While Daniel Decatur Emmett is now known only as the originator of "Dixie," he was, in his time, an extremely popular black-face comedian and composer of black-face minstrel music. Now that all available material by and on Emmett has been assembled with the aid of a grant from the American Philosophical Society, it will be possible to gain a more nearly complete idea of his activities. My sources were libraries, historical societies, private collections, and, above all, the collection of Emmett's manuscripts which I found in the Ohio State Library, Columbus, Ohio. Emmett's music, including several drafts, consists of about forty walk-arounds—stage-dances and songs parodying the life of the plantation and northern negroes—most of them written between 1859 and 1868; several banjo songs in negro dialect of the forties and fifties; two collections of contemporary banjo songs, published by Emmett (at that time spelled "Emmit") in 1843 and 1844 respectively, which includes a number of literary adaptations of his own; twelve banjo jigs; a great many "Dixie" editions and arrangements and more than two dozen "Dixie" broadsides. In addition there is *The Drummer's and Fifer's Guide* by George B. Bruce and Dan D. Emmett of 1862, which is available in a modern reprint. Emmett's literary output comprises numerous lyrics in negro dialect; more than fifty comic "negro hymns," among which is a new text to

"Dixie"; more than forty long, comic "negro sermons"; and several playlets ("Ethiopian Burlettas") in negro dialect, of which three are definitely by Emmett.

I intend to publish—or republish—about half of the walk-arounds, some of the banjo songs and banjo jigs, and a small selection of the literary material. Emmett's lyrics in plain English and in Irish dialect, as well as a few of his late songs which are not in the negro idiom, are of no particular interest and will therefore not be included in my book.

Emmett's biography will be finished soon. It will show how Emmett, as a representative of negro-minstrelsy, vitally contributed to the growth of an indigenous folk theatre and a characteristic urban folk music. My work on the history of negro minstrelsy, as far as it touches on Emmett's career, on the musical and literary style of Emmett's songs, and on the history of "Dixie," is still in progress.

On December 2, 1943, I gave a lecture before the American Musicological Society in New York entitled "Daniel D. Emmett (the composer of "Dixie") and the Rise of Burnt-Cork Minstrel Music."

### PHILOSOPHY

ARON GURWITSCH, Harvard University

Grant No. 654 (1942), \$1,200. William James' theory of the "transitive parts" of the stream of thought; comparative study of William James' concept of the "object of thought."

With his theory of the "transitive parts" of the stream of thought William James attempts to account for the immediately experienced continuity and coherence of conscious life. Continuity of consciousness turns out to be but another name for its intrinsic temporality. Owing to the self-same facts through which consciousness appears as an unbroken connection of mental states, these states themselves are given as temporal phenomena, as having duration, forming a sequence, and standing in temporal relations to each other. The temporality of consciousness cannot be experienced except in its very continuity and coherence; and, conversely, it is in exhibiting its temporal aspect that consciousness appears as continuous and coherent. William James' views as formulated in his theories of the "transitive parts," the experience of time, especially the "specious present," etc., belong together with the doctrines of

Bergson and Husserl in which stress is laid upon the temporality and continuity of consciousness. The present paper embarks upon the confrontation of James' tenets with Husserl's analysis of the experience of time and temporality in his *Vorlesungen zur Phänomenologie des inneren Zeitbewusstseins*. With regard to phenomenal temporality and experience of time there is a far reaching agreement between both thinkers, as far as the major points at issue are concerned.

The historical significance of James' theory consists in that he attempts to account for the continuity of consciousness on the grounds of empiricism. The classical British empiricism had failed to provide a satisfactory solution of the problem in question, as this is exemplified in Hume's analysis of the experience of time. A closer examination of Hume's analysis shows that he describes the experience of time as though this experience were made by an external observer, or as though mind were an external observer of itself. On the grounds of Hume's theory, experience of time turns out to consist in ascertaining that change has occurred in consciousness, that one mental state has been followed upon by a different one, and that time has elapsed. But Hume fails to account for the very succeeding itself, for the flow of consciousness and the passing of time, for succession and transition as immediately experienced, and not ascertained and inferred after the event. This criticism holds independently of the difficulties in which Hume's general theory of "ideas" as faint copies of "impressions" is involved. In the present context the question of special interest is as to whether temporal characters, e.g. pastness, may be accounted for in terms of degrees of intensity, "force," "vivacity," and "liveliness."

Attempting to achieve a more adequate description of the continuity of consciousness, James is led to call attention to mental states which had been neglected in the school of classical British empiricism. He is among the first, if he is not the very first, to emphasize the existence of imageless thought. Other pertinent mental facts are the "feelings of relation" including logical relations, the "sensation of difference," the "shock of likeness," the "feelings of tendency," of "direction," and what James describes under the heading of "fringes." All these mental facts have in common the descriptive status of vagueness and indefiniteness and the functional significance of transitivity. It is through specific



facts like the mentioned ones that the experiencing subject is at every moment aware of the continuity and temporality of his conscious life. The close relationship which, according to James, exists between the "transitive parts" and the experience of time appears also in the hypothesis which he advances as to the physiological processes underlying both phenomena.

It must be stressed that the "transitive parts" are not scattered data occasionally experienced now and then. On the contrary, "transitive parts" pervade the whole of conscious life so that there is no concrete mental state without containing "transitive parts" as ingredients. On this account every mental state exhibits temporal aspects, i.e., is experienced as having duration and as integrated into a temporal order which is the continuously flowing stream of conscious life. Owing to the "transitive parts" which enter into every concrete mental state, the latter is experienced as pertaining to, and forming a phase of, the stream of consciousness. Hence it appears that in establishing the theory of the "transitive parts" James has achieved more than solving a special problem. He sets forth a new general conception of conscious life, according to which temporality turns out to be the very substance of consciousness. It is in accordance with the central position of the theory in question that the latter is in close connection with some doctrines of major importance for James' thought. The empiricistic trend which is predominant in all doctrines of James' appears in the theory under discussion in that experiences of transitions, relations, connections, conjunctions, etc., which are "transitive parts," have the same psychical reality and existence as any other mental facts. On the other hand, when "transitive parts" enter as ingredients into every concrete mental state, the "substantive parts" which are contained in this state are not only surrounded but also qualified by the former. Consequently a "substantive nucleus" escorted by certain "transitive parts" is different from what it would be if the actual "transitive parts" were replaced by different ones. Hence no concrete mental state is built up out of parts, elements, components which preserve their identity when they appear in different contexts or when they are extracted from any context and are taken in isolation. James' theory of the "transitive parts" thus meets his repudiation of the "mind-stuff theory" and corroborates his contention that there is no self-compounding, integration, synthesis, etc., among mental states.

That temporality appears as the substance of consciousness means that it is a necessary condition of conscious life and of whatever may exist for consciousness. This result of James' is a definitive achievement of historical significance. However the question arises as to whether this necessary condition is also sufficient. To put it in other words, may consciousness and whatever exists for the latter be satisfactorily accounted for in terms of temporality alone or must allowance be made for some other factor of much the same generality as that which James rightly ascribes to temporality? The above is an abstract of a paper<sup>1</sup> which confines itself to formulating this problem which is approached from various points of view.

The writer had the intention to discuss the problems brought out in the above-mentioned article in two subsequent papers to be entitled respectively "Approach towards a field theory of consciousness" and "William James' temporalistic conception of consciousness." During his work on these papers, the scope of his investigations has progressively been widened so that the writer finally came to the decision to absorb the material of these projected papers into a book to which he will give the title *Field Theory of Consciousness*. About one half of this book is already completed.

In his application for this grant the writer included the project of a further study bearing on James' concept of the "object of thought" and on equivalent concepts developed both in contemporary philosophy and other fields of experience. He thought of integrating this study also in the book on which he has been working, but it now appears more advisable to present this study in a separate form.

During the past year the writer has devoted all his time and energy to the projects in question. He will continue to do so within the limits which his duties as recently appointed Instructor in Physics at Harvard University impose upon his philosophical studies.

<sup>1</sup> Gurwitsch, Aron. *Philosophy and Phenomenological Research* III, Buffalo, N. Y., 1943, 449-477.

## 6. REPORT OF THE COMMITTEE ON FINANCE

According to the Laws of the Society, the Committee on Finance consists of the President and the Treasurer, *ex-officio*, and not fewer than five other members who shall be nominated by the President and elected by the Society at the General Meeting in April.

Chapter V, Articles 3 and 4 of the Laws read:

“The Committee on Finance shall have the general superintendence of the financial concerns of the Society. It shall have the custody and control of all the securities and investments of the Society, both real and personal, with full power and authority to buy and to sell, and to invest and reinvest the same; including the power to purchase and to sell real estate and to make leases thereof, to satisfy mortgages and extinguish ground rents, and to direct the placing of all such insurances as it may deem necessary; as well as to borrow on the credit of the assets of the Society, to create mortgages thereon, and to make such improvements, repairs and alterations to real estate as it may deem necessary. It shall have power to authorize the proper Officers of the Society to execute the necessary papers to effect all purchases, sales and assignments of property, both real and personal; to execute and to satisfy mortgages, to extinguish ground rents and to transfer registered securities; to subscribe to bond-holders’ agreements to plans of reorganization involving any securities held by the Society or in which it has an interest, and to do all such acts as are necessary in pursuance of the foregoing powers.

“The Committee on Finance shall always have access to the Treasurer’s books, accounts, and vouchers, and shall cause an audit of such accounts to be made at least once a year. It shall require from the Treasurer an annual report of all the operations of the treasury, which it shall present to the Council with an annual statement of estimates of receipts and expenditures. With the approval of the Council it shall determine the fiscal year of the Society and, in case of emergency needs, authorize appropriations over and above the annual budget.”

During the year 1943-44, the Committee on Finance consisted of Marshall S. Morgan, *Chairman*, Oliver E. Buckley, Thomas S.

Gates, Edward Hopkinson, Jr., John Story Jenks, Nicholas Kelley, Roland S. Morris, Charles J. Rhoads, J. Henry Scattergood, and Edwin G. Conklin, *President*. Luther P. Eisenhower, *Executive Officer*, sat with the Committee.

The members of the Committee meet regularly once a month from January to June and from October to December with occasional special meetings.

## REPORT OF THE TREASURER

### GENERAL AND SPECIAL FUNDS

There are twenty-three funds in the keeping of the Society. Only five of these are unrestricted in the uses to which their income may be applied "for promoting useful knowledge"; three specify a primary purpose, after which any balance may be used for general purposes; fifteen are restricted to specific uses, eleven of these being for the purchase of books for the Library. These funds and the manner and purpose of their establishment are listed alphabetically below.

#### ASSOCIATED FUND

Created as of December 31, 1939, in accordance with a resolution adopted by the Committee on Finance, December 5, 1939, with the approval of Legal Counsel. All assets held in the Balch International Law Library, Boyé Library, Brush Endowment, Carlier Library, Franklin Library, Jefferson Library, Lewis, Magellanic, Michaux, Norris Library, Phillips Library, Proud Library, Séybert Library, Tilghman Library, and Whitfield Funds, have been transferred to the Associated Fund at their market value, and each contributing fund has been assigned a proportionate interest in the Associated Fund based on the value of assets contributed.

#### BALCH INTERNATIONAL LAW LIBRARY FUND

Founded by Thomas Willing Balch, Esq., of Philadelphia, October 13, 1911, with an initial gift of securities valued at about \$700, increased by later gifts to about \$1,600, as a memorial to his father for his part in bringing about the submission of the Alabama Claims to the Geneva Tribunal. A part of the income to be used for the purchase of books relating to the law of nations

and such other uses, when thought advisable, as may promote the study of that science; a part, not less than one-half, to be added annually to the principal.

#### BOYÉ LIBRARY FUND

Bequest of \$1,879.21 by Professor Martin Boyé, of Coopersburg, Pa., who died March 5, 1909. By resolution of the Society, December, 1910, the income to be expended in the purchase of books, preferably on chemistry and geology.

#### BRUSH ENDOWMENT FUND

Gift of \$10,000 by Charles Francis Brush, LL.D., of Cleveland, Ohio, November 24, 1914. Income to be used for the general purposes of the Society.

#### BUILDING FUND

Created by deed of trust dated June 4, 1900, Girard Trust Company, depositary and trustee. All money or property which shall be designated or devoted by any donor, testator or other person, for the acquisition of land or buildings for the Society's use, shall be forthwith paid over, conveyed, or delivered by the Society to the said depositary, for the acquisition of land and the construction and furnishing of buildings for the use and occupation of the Society. The present value is \$632,309.11.

#### CARLIER LIBRARY FUND

Bequest of \$5,000 by Auguste Carlier, of Paris, who died March 16, 1890. The income, less 10 per cent, which is to be added to the principal, is to be expended for the purchase of books for the Library.

#### CARNEGIE LIBRARY FUND

Gift of \$100,000 by the Carnegie Corporation in 1931. The income to be used for the maintenance of the Library.

#### DALAND FUND

Bequest of the residuary estate of Dr. Judson Daland, of Philadelphia, who died August 14, 1937, approximately \$220,000. The income, less 10 per cent which is to be added annually to the principal, to be used by the Society for research in clinical medicine.

**FRANKLIN LIBRARY FUND**

Established by the Library Committee in May, 1911, from funds derived from the proceeds of the sale in that year of duplicates, formerly the property of Benjamin Franklin, approximately \$3,400. The income to be used for the purchase of books.

**GENERAL FUND**

This fund has been accumulated from various sources through many years; its income is available for the general purposes of the Society.

**JEFFERSON LIBRARY FUND**

Established by the Library Committee on January 20, 1905, from the proceeds of royalties from the publication of manuscripts acquired by the Society through President Thomas Jefferson, approximately \$1,700. Income to be used for the purchase of books.

**JOHNSON FUND**

Established in 1937 when Mr. Eldridge Reeves Johnson removed the restriction on his gift of \$500,000 and changed it to General Endowment until 1957, unless prior thereto Mr. Johnson directs that it be used for some other purpose of the Society. After 1957 it is to become an unrestricted gift. All income to be used for the general purposes of the Society.

**LEWIS FUND**

Gift of \$10,000 made by Mrs. John F. Lewis in 1935 in memory of her husband; the income to be used each year as an award to the American citizen who shall announce at any general or special meeting of the Society, and publish among its papers, some truth which the Council of the Society shall deem worthy of the award. In any year income not so awarded to be added to principal.

**MAGELLANIC FUND**

Gift of 200 guineas by John Hyacinth de Magellan, of London, in 1786, for a gold medal to be annually awarded under prescribed terms, to the author of the best discovery or most useful invention relating to navigation, astronomy, or natural philosophy (mere natural history only excepted). Any surplus of interest

remaining to be used for such purposes as may be authorized under the Society's Charter and Laws. By resolution of the Society, December, 1899, the unexpended annual income, less 10 per cent which is to be added to the principal, may be used for the purchase of books relating to those departments of science in which the premium is annually offered.

#### MANUSCRIPTS AND IMPRINTS FUND

Established by the Society, November 20, 1943, from unappropriated allotments made to the Committee on Library, to be held subject to the Committee on Library; income to be turned over to the General Fund.

#### MICHAUX FUND

Bequest of 92,600 francs by François André Michaux, who died at Vaureal, France, October 23, 1855; for the extension and progress of agriculture, and more especially of silviculture, in the United States. By resolution of the Society, March, 1899, the income, less 10 per cent reserved for investment, to be used for the purchase of books on forestry, etc.

#### NORRIS LIBRARY FUND

Established by the Library Committee in May, 1911, from the proceeds of the sale in that year of duplicate pamphlets, presented to the Society in 1815 by Joseph Parker Norris, Esq., of Philadelphia, approximately \$2,100. Income to be used for the purchase of books.

#### PHILLIPS LIBRARY FUND

Bequest of his residuary estate, approximately \$3,410 (December, 1895), by Henry Phillips, Jr., Esq., of Philadelphia, who died June 6, 1895, to which were later added two bequests to him, confirmed and audited October 5, 1903, of \$7,547.54 from the estate of his aunt, Emily Phillips, and of \$42,315.80, being an interest in the residuary estate of his uncle, Henry M. Phillips. Income to be used for the purchase of books on archaeology and philology in accordance with the terms of the bequest.

#### PHILLIPS PRIZE ESSAY FUND

The gift on October 5, 1888, of \$5,000 by Miss Emily Phillips, of Philadelphia, in memory of her brother Henry M. Phillips.

Income to be used in the awarding of a prize for the best essay of real merit on the science and philosophy of jurisprudence.

#### PENROSE FUND

Bequest of one-half of the residuary estate of Dr. Richard A. F. Penrose, Jr., of Philadelphia, who died July 31, 1931, approximately \$3,900,000; by the terms of the bequest this gift to be considered an endowment fund, the income of which only is to be used and the capital to be properly invested.

#### PROUD LIBRARY FUND

Established by the Library Committee in May, 1911, from the proceeds of the sale in that year of duplicate pamphlets presented in 1812 by Robert Proud, Esq., of Philadelphia, \$2,500. Income to be used for the purchase of books.

#### RESERVE FUND FOR POST-WAR EXPENDITURES

Established by the Society, November 20, 1943, from unappropriated allotments made to specific committees; available to the committees when needed unless the Council takes other action; income to be turned over to the General Fund.

#### SEYBERT LIBRARY FUND

Bequest of \$2,000 by Henry Seybert, Esq., of Philadelphia, who died March 3, 1883. By resolution of the Society, November, 1909, the income to be expended for the purchase of books.

#### TILGHMAN LIBRARY FUND

Bequest of \$200 by Chief Justice William Tilghman, of Philadelphia, who died April 30, 1827. Income to be expended for the purchase of books.

#### WHITFIELD FUND

Bequest of the residuary estate of James Edward Whitfield of Philadelphia, who died November 4, 1930; approximately \$42,000. This fund was left "absolutely and in fee." Ten per cent of the income will be added to principal annually and the balance applied to general purposes of the Society.

#### WOOD MEMORIAL FUND

Bequest of the residuary estate of Walter Wood, of Philadelphia, who died April 20, 1934, approximately \$150,000, in memory of his uncle, George B. Wood, his cousin, Horatio G.



Wood, and his two brothers, Richard and Stuart Wood, all of whom were members of the American Philosophical Society; to be used by the Society first for the construction of a building that shall be adequate for the needs of the Society and if there be any surplus, then the same to be applied to such useful purpose or purposes as the Counsel (sic) and Officers of said Society may determine.

Heretofore it has been the custom, on closing the books at the end of each year, to carry forward unexpended allotments made to the various committees. At the meeting of the Society held on November 20, 1943, it was decided that the balances of unappropriated funds allotted to the specific committees should be set aside in a new account to be known as "Reserve Fund for Post-War Expenditures." This money is to be available to the specific committees when needed unless the Council takes other action; accordingly such an account was opened.

At the same time the Society authorized a new account to be known as "Manuscripts and Imprints Fund" into which unexpended balances in "Books and Binding" and "Manuscripts" were transferred, the "Manuscripts" account being closed.

Distribution of the Society's portfolio is, as follows:

Cash.....	1.2%
Bonds.....	61.7%
Preferred Stocks.....	8.7%
Common Stocks.....	28.4%

The average return on the portfolio is 3.71%; 27.2% is invested in U. S. Government obligations, and in addition 5.3% is invested in State, County, and Municipal obligations. These two items, in part, account for the rate of return.

We hold real estate having an appraised value of approximately \$565,000 received from the estate of Walter Wood; in addition in three other Funds there is approximately \$46,000 invested in mortgages and in the Building Fund \$203,000 invested in mortgages and real estate. These figures are book values and are not likely to be realized in final liquidation.

The current total of all the funds of the Society had a book value December 31, 1943, of \$7,749,007.59; that portion of these funds invested in securities showed an appreciation or profit realized during the past five years of a little over \$600,000.

The budget for the ensuing year follows:

## BUDGET FOR 1944

## ESTIMATED INCOME

*Unrestricted Funds*

General.....	\$ 39,929.00	
Charles Francis Brush Endowment....	450.27	
Johnson Endowment.....	21,817.50	
Richard A. F. Penrose, Jr., Endowment.....	152,894.50	
Whitfield.....	1,814.65	
		<hr/>
		\$216,905.92

*Semi-Restricted Funds*

Magellanic.....	\$ 223.79	
François André Michaux.....	2,130.91	
Wood Memorial.....	11,119.75	
		<hr/>
		\$ 13,474.45

*Restricted Funds**A. Library Funds*

Thomas Balch International Law..	\$ 188.31	
Martin Boyé.....	135.31	
Auguste Carlier.....	562.48	
Carnegie Library.....	3,000.00	
Benjamin Franklin.....	399.02	
Thomas Jefferson..	150.27	
Joseph Parker Norris.....	187.03	
Henry Phillips, Jr.....	3,666.08	
Robert Proud.....	229.11	
Henry Seybert.....	153.58	
William Tilghman.....	81.71	
		<hr/>
		\$ 8,752.90

*B. Special Funds*<sup>1</sup>

Judson Daland.....	\$ 7,499.00	
John F. Lewis Prize.....	408.48	
Henry M. Phillips Prize Essay....	474.50	
		<hr/>
		\$ 8,381.98
Sales of Publications.....		3,000.00
		<hr/>
		<u>\$250,515.25</u>

<sup>1</sup> See Schedule VIII for Building Fund.

## ESTIMATED EXPENSES

Executive Office . . . . .	\$ 8,000.00	
Secretaries' Expense . . . . .	2,500.00	
Telephone . . . . .	600.00	
Insurance . . . . .	2,000.00	
Committee on Publications:		
Publication Expense . . . . .	17,000.00	
Publication—Salaries . . . . .	6,000.00	
Committee on Library:		
Books and Binding . . . . .	7,000.00	
Librarians' Salaries . . . . .	10,000.00	
Library—Administration . . . . .	1,000.00	
Rental for Housing of Library . . . . .	9,300.00	
Treasurer's Expense . . . . .	10,000.00	
Hall Fund . . . . .	2,500.00	
Committee on Research:		
Penrose Fund . . . . .	75,000.00	
Johnson Fund . . . . .	19,000.00	
Daland Fund . . . . .	8,000.00	
Research Expense (Penrose Fund) . . . . .	1,000.00	
Meetings . . . . .	10,000.00	
Pensions . . . . .	1,800.00	
Miscellaneous . . . . .	23,000.00	
		<u>\$213,700.00</u>

Balances carried forward from 1943 to  
pay appropriations made under  
the 1943 budget:

Publication Expenses . . . . .	\$ 17,406.19	
World-wide Broadcasting Founda- tion . . . . .	750.00	
Research Fund (Penrose Fund) . . . . .	19,532.34	
Research Fund (Johnson Fund) . . . . .	750.00	
Research Fund (Daland Fund) . . . . .	375.00	
		<u>\$ 38,813.53</u>

The total book value of the investments and cash held as  
Principal as shown by the Accountants' report is:

Unrestricted Funds . . . . .	\$5,901,162.65	
Semi-Restricted Funds . . . . .	742,818.34	
Restricted Funds . . . . .	472,717.49	
Building Fund . . . . .	632,309.11	
		<u>\$7,749,007.59</u>

The following report of our Certified Public Accountants shows income and disbursements in accordance with the method heretofore followed. The income from funds known as "Restricted" which are applied to specific purposes is separately recorded in Schedule III.

The income from the Wood Fund Personalty and the Wood Fund Real Estate is shown in Schedules IV and V; this income was added to Principal during the last year with the understanding that it might subsequently be withdrawn. It is the intention of the Committee on Finance to follow the same course during the coming year.

The income from the Building Fund, of which the Girard Trust Company is Trustee, is added to Principal, in accordance with the Trust Agreement establishing this Fund, except insofar as it is required to maintain the Hall.

Contributions received from the Carnegie Corporation for Investigation on Methods and Results of Adult Education in Science are kept in a separate account.

All other income and all other expenses are consolidated into the General Fund (see Schedule I) so that that Fund, in effect, sets forth the operating income and disbursements of the Society.

During the past year receipts from the General Fund were:

Balance 1/1/43 . . . . .	\$ 1,776.73	
Income (Consolidated) . . . . .	<u>234,352.95</u>	
		\$236,129.68
Disbursements (Consolidated) . . . . .		<u>193,895.95</u>
Balance . . . . .		\$ 42,233.73
To increase the income of the Society, \$75,000 has been taken from the unexpended appropriations for temporary investment, the investments being added to the principal of the General Fund. . . .		
		<u>75,000.00</u>
Overexpended (temporarily invested) . . . . .		\$ 32,766.27

Respectfully submitted,  
 FIDELITY-PHILADELPHIA TRUST COMPANY,  
 TREASURER,  
 MARSHALL S. MORGAN, *President*.

## REPORT OF THE CERTIFIED PUBLIC ACCOUNTANTS

LINVILL &amp; PARRY

*Certified Public Accountants*

Twelve South Twelfth Street, Philadelphia

February 16, 1944

DR. EDWIN G. CONKLIN, *President*,  
The American Philosophical Society,  
Philadelphia, Pennsylvania

*Dear Sir:*

## GENERAL AND TRUST FUNDS

We have examined the accounts of the American Philosophical Society for the year ended December 31, 1943, as contained in the records of the Treasurer, the Fidelity-Philadelphia Trust Company. The appended statements, Schedules I to VII inclusive, are in accordance with these records.

We have examined paid cancelled checks and vouchers in connection with disbursements in the various funds except the Wood Fund Real Estate Income Account, as to which we have accepted the cash records of the Fidelity-Philadelphia Trust Co., as agent, without any further examination. The cash in bank at December 31, 1943, as summarized in Schedule VI, has been verified.

We have examined into the changes during the year in the investments in all of the funds. We examined the perpetual and other fire insurance policies carried as an investment in the General Fund, and obtained detailed statements from the Fidelity-Philadelphia Trust Company, the Girard Trust Company, and The Pennsylvania Company, etc., showing at December 31, 1943, the bonds, stocks, real estate and other investments held by them as agents or trustees for the Society, thus satisfactorily accounting for all of the investments of the Society as called for by the records at December 31, 1943.

The investments composing the various funds at December 31, 1943, as summarized in the appended statement (Schedule VII) are at book value, which, in all funds except the Associated Fund, is as follows: Bonds and Mortgages at par or face value to January 1, 1940 and at par or cost, whichever is lower, for subsequent purchases; Stocks at cost when purchased or at inventory value when received as gifts or bequests; and Real Estate at amount of fore-

closed mortgage plus costs of acquisition and subsequent improvements, and appraised or assessed value when acquired as gifts or devises. The Associated Fund investments are at December 31, 1942 market values and subsequent purchases at cost. We have not determined the current market value of any of the investments of the Society.

Income due for the year from the investments has been received and recorded on the books prior to December 31, except as follows:

General and Other Trust Funds:

Extra Dividend on 600 shares of Insurance Com-	
pany of North America . . . . .	\$300.00
Mutual Assurance Company Dividend . . . . .	30.00
These items were received after the close of the	
year.	
	<hr/>
	\$330.00
Carnegie Library Fund:	
Delinquent Mortgage Interest . . . . .	75.00
	<hr/>
	\$405.00
	<hr/>

Comprehensive tests have been made of income receivable from other sources, except as to real estate, for which we have not examined leases, rental statements or other data in connection with income recorded as being received.

BUILDING FUND

\* *Girard Trust Company, Trustee*

We have examined statements submitted by the Girard Trust Company, Trustee, of the Building Fund for the year ended December 31, 1943, have examined the records in the Society's office of subscriptions or pledges to the fund, and have prepared the appended statement of Cash Receipts and Disbursements and Summary of the Assets for the year—Schedules VIII and IX.

The cash and investments are in accordance with a statement obtained by us from the Girard Trust Company, Trustee, setting forth in detail the assets in their possession at December 31, 1943. All of the investments are at par value except stocks, which are at cost, with real estate (participations) at amount of foreclosed mortgage plus costs of acquisition and subsequent improvements.

We have not determined the present value of any of the investments, or the collectibility of the unpaid pledges to the fund.

We have examined into the changes during the year in the investments, and have accounted for all income due except delinquent mortgage interest \$7,643.53, of which amount \$5,792.75 was delinquent January 1, 1943.

Respectfully submitted,

LINVILL & PARRY,

*Certified Public Accountants.*

## SCHEDULE I

## CASH RECEIPTS AND DISBURSEMENTS

*Year ended December 31, 1943*

## GENERAL FUND

*Principal Account*

Balance, January 1, 1943..... \$ 6,808.72

## Receipts:

## Investments Sold or Redeemed:

Municipal Bonds (\$4,000.00).....	\$ 4,000.00
Railroad, Industrial and Miscellaneous Bonds (\$17,500.00).....	8,255.16
Common Stocks (Fractional Share).....	5.01
On Account of Mortgages.....	200.00
Fine Arts All Risks Insurance (one year's charge) ..	1,205.30
Transferred from Income Account.....	75,000.00

88,665.47

\$ 95,474.19

## Disbursements:

## Investments Purchased:

U. S. Government Bonds (\$15,000.00).....	\$ 15,000.00
Railroad Bonds (\$20,000.00).....	18,528.05
Bank Stocks.....	1,298.22
Common Stocks.....	51,351.98
Postage and Insurance.....	.38

86,178.63

Balance, December 31, 1943..... \$ 9,295.56

*Income and Operating Account*

Balance, January 1, 1943..... \$ 1,776.73

## Receipts:

Income from Investments.....	\$ 41,582.06
Girard Trust Company Building Fund Reimburse- ment for alterations and furnishing of Society's building, etc.....	1,482.69
Sale of Publications.....	5,406.26
Royalties on W. B. Scott's book, "History of Land Mammals in the Western Hemisphere".....	200.06
The Henry LaBarre Jayne Lecture Foundation....	200.00

## Contributions for Research:

Dr. Henry Winsor.....	\$ 600.00
Sundry for Steindorff Grant.....	1,020.00

1,620.00

Sale of Microfilms..... 286.28

## Refunds:

Penrose Research Fund Grants.....	\$ 1,926.83
Daland Research Fund Grants.....	131.79

2,058.62

Amounts forwarded..... \$ 52,835.97 \$ 1,776.73



Brought forward.....	\$ 52,835.97	\$ 1,776.73
Transfer of Income from Trust Funds:		
Richard A. F. Penrose, Jr., Endow-		
ment Fund.....	\$148,066.43	
Johnson Endowment Fund.....	19,000.00	
Judson Daland Fund.....	8,000.00	
Whitfield Fund.....	3,225.10	
Carnegie Library Fund.....	2,919.94	
Charles F. Brush Endowment Fund..	305.51	
	<u>181,516.98</u>	
		<u>234,352.95</u>
		<u>\$236,129.68</u>

## Disbursements:

## Salaries:

Executive Office.....	\$ 7,498.24	
Library.....	9,856.89	
Publication.....	5,370.39	
	<u>\$ 22,725.52</u>	

Pensions.....	2,216.65	
Secretaries' Expenses.....	2,624.95	
Telephone.....	700.56	
Publication Expenses.....	28,877.22	
Committee on Conservation of Cultural Resources..	100.00	
Independence Hall Association.....	200.00	
Books and Binding.....	22,726.42	
Camera Expenses.....	233.91	
Insurance.....	2,213.90	
Meetings.....	10,037.92	
Hall Expenses.....	2,861.98	
Hall Equipment, Alterations and Furnishings.....	1,040.34	
Library Rental (Drexel Building).....	9,300.00	
Investment Counsel Fees.....	2,500.00	
Auditing Fees.....	1,025.00	
Legal Expenses.....	50.00	
Treasurer's Expense.....	36.80	
World-wide Broadcasting Foundation.....	6,959.65	

## Research Fund Grants:

Wistar Institute (Henry Winsor Con-		
tribution).....	\$ 600.00	
Professor George Steindorff (Sundry		
Contributions).....	1,020.00	
Penrose Fund.....	58,962.88	
Johnson Fund.....	8,525.00	
Daland Fund.....	7,125.00	
	<u>76,232.88</u>	
Research Expenses.....	182.91	
Miscellaneous Expenses.....	7.06	
Treasurer's Commissions.....	\$ 7,032.96	
Agent's Commission (Girard Trust Com-		
pany, Carnegie Fund).....	196.43	
	<u>7,229.39</u>	
Charged Other Funds.....	6,187.11	
	<u>1,042.28</u>	
		<u>193,895.95</u>

Amount forwarded..... \$ 42,233.73

Brought forward .....	\$ 42,233.73
Transfer to Principal Account for Investment.....	75,000.00
	<hr/>
Overexpended, December 31, 1943—General Fund (Temporarily Invested) .....	\$ 32,766.27

## COMMITTEE ON EDUCATION AND PARTICIPATION IN SCIENCE

*Grant from Carnegie Corporation of New York*

Balance Unexpended, January 1, 1943.....	\$ 6,368.01	
Receipts:		
Sale of Pamphlets.....	\$ 6.35	
Phila. Council of Amateur Scientists....	57.98	
	<hr/>	64.33
		<hr/>
	\$ 6,432.34	
Expended.....	5.67	
	<hr/>	
Balance Unexpended, December 31, 1943.....		6,426.67
		<hr/>
Net Overexpended.....		\$ 26,339.60
		<hr/> <hr/>

## Note:

The following General Fund appropriations are carried forward:

Publication Expenses.....	\$ 17,406.19
World-wide Broadcasting Foundation.....	750.00
Research Fund:	
Penrose Fund.....	\$ 19,532.34
Johnson Fund.....	750.00
Daland Fund.....	375.00
	<hr/>
	20,657.34
	<hr/>

Total General Fund appropriations carried forward.. \$ 38,813.53

# SCHEDULE II

## SUMMARY OF CASH RECEIPTS AND DISBURSEMENTS

Year ended December 31, 1943

### TRUST FUNDS—PRINCIPAL ACCOUNT\*

	Balance 1-1-1943	Receipts Proceeds from Invest- ments Sold or Matured	Transferred from or to Income Account	Total	Investments Purchased	Disbursements Transferred to Associated Fund	Total	Balance 12-31-43
<i>Unrestricted Funds:</i>								
Charles Francis Brush Endowment.....	—	—	\$ 135.79	\$ 135.79	—	\$ 135.79	\$ 135.79	—
Johnson Endowment.....	\$ 3,051.29	\$128,874.07	6,928.33	138,853.69	\$128,497.22	—	128,497.22	\$10,356.47
Richard A. F. Penrose, Jr., Endowment.....	28,868.63	761,024.33	423.12	789,469.84	786,658.88	—	786,658.88	2,810.96
Whitfield.....	—	—	547.25	547.25	—	547.25	—	—
	\$31,919.92	\$889,898.40	\$ 7,188.25	\$ 929,006.57	\$915,156.10	\$ 683.04	\$915,839.14	\$13,167.43
<i>Semi-restricted Funds:</i>								
Magellanic.....	—	—	\$ 67.52	\$ 67.52	—	\$ 67.52	\$ 67.52	—
François André Michaux.....	—	—	642.63	642.63	—	642.63	642.63	—
	—	—	\$ 710.15	\$ 710.15	—	\$ 710.15	\$ 710.15	—
<i>Restricted Funds:</i>								
<i>Library Funds:</i>								
Thomas Balch International Law .....	—	—	\$ 94.65	\$ 94.65	—	\$ 94.65	\$ 94.65	—
Martin Boyé.....	—	—	40.80	40.80	—	40.80	40.80	—
Auguste Carlier.....	—	—	169.62	169.62	—	169.62	169.62	—
Carnegie Library.....	\$ 148.51	\$ 8,681.92	—	8,830.43	—	—	—	\$ 8,830.43
Benjamin Franklin.....	—	—	120.33	120.33	—	120.33	120.33	—
Thomas Jefferson.....	—	—	45.32	45.32	—	45.32	45.32	—
Joseph Parker Norris .....	—	—	56.40	56.40	—	56.40	56.40	—
Henry Phillips, Jr.....	—	—	1,108.82	1,108.82	—	1,108.82	1,108.82	—
Robert Proulx.....	—	—	69.09	69.09	—	69.09	69.09	—
Henry Seybert.....	—	—	46.32	46.32	—	46.32	46.32	—
William Tilghman.....	—	—	24.64	24.64	—	24.64	24.64	—
	\$ 148.51	\$ 8,681.92	\$ 1,775.99	\$ 10,606.42	—	\$1,775.99	\$ 1,775.99	\$ 8,830.43
<i>Special Funds:</i>								
Judson Daland.....	1,183.68	30,445.56	2,546.74	34,175.98	30,850.82	—	30,850.82	3,325.16
John F. Lewis Prize.....	—	—	123.18	123.18	—	123.18	123.18	—
Henry M. Phillips Prize Essay.....	264.75	5,030.37	102.82	5,397.93	4,616.67	—	4,616.67	781.26
	\$ 1,596.93	\$ 44,157.85	\$ 4,548.73	\$ 50,303.51	\$ 35,467.49	\$1,899.17	\$ 37,366.66	\$12,936.85
	—	—	\$ 3,292.36	\$ 3,292.36	—	\$3,292.36	\$ 3,292.36	—
Transferred to Associated Fund.....	—	—	—	—	—	—	—	—
Associated Fund.....	\$ 1,927.84	\$ 20,108.77	\$ 3,292.36	\$ 34,328.97	\$ 31,098.91	—	\$ 31,098.91	\$ 3,230.06
Totals.....	\$35,444.69	\$963,165.02	\$12,447.13	\$1,011,056.84	\$981,722.50	—	\$981,722.50	\$29,334.34

\* Exclusive of: Wood Fund—See Schedules IV and V. Building Fund—See Schedules VIII and IX.

# SCHEDULE III

## SUMMARY OF CASH RECEIPTS AND DISBURSEMENTS

Year ended December 31, 1943

### TRUST FUNDS—INCOME ACCOUNT\*

	Receipts		Disbursements		Total	Balance 12-31-43
	Balance 1-1-1943	Gross Income Investments	For Purpose of Fund	Treasurer's and Agent's Commissions and Mis- cellaneous	Transferred to or from Principal Account	
<i>Unrestricted Funds:</i>						
Charles Francis Brush Endowment..	—	\$ 441.30†	—	—	\$ 305.51	\$ 441.30
Johnson Endowment.....	\$18,085.57	23,094.43	—	\$ 596.85	19,000.00	26,525.18
Richard A. F. Penrose, Jr., Endow- ment.....	—	151,564.43	—	3,921.12	148,066.43	151,564.43
Whitfield.....	1,993.89	1,778.46†	—	—	3,225.10	3,772.35
	\$20,079.46	176,878.62	196,958.08	\$4,517.97	170,597.04	\$182,303.26
<i>Semi-restricted Funds:</i>						
Magellanic.....	\$ 790.73	219.42†	\$ 1,010.15	—	\$ 67.52	\$ 926.57
François André Michaux.....	6,899.71	2,088.43†	8,988.14	—	642.63	8,088.12
	\$ 7,690.44	2,307.85	\$ 9,998.29	—	\$ 710.15	\$ 9,014.69
<i>Restricted Funds:</i>						
<i>Library Funds:</i>						
Thomas Balch International Law ..	\$ 539.76	184.56†	\$ 724.32	—	\$ 94.65	\$ 612.67
Martin Boyé.....	592.93	132.61†	725.54	—	40.80	675.13
Auguste Carlier.....	818.62	551.27†	1,369.89	—	169.62	898.62
Carnegie Library.....	—	6,547.49	6,547.49	\$3,627.55	2,919.94	6,547.49
Benjamin Franklin.....	586.33	391.07†	977.40	—	120.33	687.38
Thomas Jefferson.....	470.63	147.28†	617.91	—	45.32	515.75
Joseph Parker Norris.....	545.51	183.30†	728.81	—	56.40	582.76
Henry Phillips, Jr.....	8,549.98	3,603.81†	12,153.79	—	1,108.82	1,478.53
Robert Proud.....	763.29	224.54†	987.83	—	69.09	730.89
Henry Seybert.....	594.95	150.52†	745.47	—	46.32	169.16
William Tilghman.....	247.60	80.09†	327.69	—	24.64	43.54
	\$13,709.60	12,196.54	\$ 25,906.14	\$3,492.70	\$ 2,919.94	\$ 11,816.18
<i>Special Funds:</i>						
Judson Daland.....	8,586.22	8,489.13	17,075.35	—	2,546.74	10,759.49
John F. Lewis Prize.....	800.28	400.35†	1,200.63	—	123.18	433.18
Henry M. Phillips Prize Essay ...	965.43	342.74	1,308.17	8.57	102.82	119.39
	\$24,061.63	21,428.76	\$ 45,490.29	\$3,802.70	\$ 10,919.94	\$ 23,130.24
Associated Fund.....	—	\$ 271.27†	\$ 271.27	—	—	\$ 271.27
Totals.....	\$51,831.43	\$200,886.50	\$252,717.93	\$3,638.11	\$181,516.98	\$206,678.37
						\$14,089.96
						6,315.86
						767.45
						1,196.78
						\$22,370.05
						—
						\$271.27
						\$206,678.37

\* Exclusive of: Wood Fund—See Schedules IV and V. Building Fund—See Schedules VIII and IX.  
† Income from Investments—Associated Funds Total \$10,837.47. Henry Phillips, Jr. Fund—Income from Agent \$10.81

SCHEDULE IV  
CASH RECEIPTS AND DISBURSEMENTS

*Year ended December 31, 1943*

WOOD FUND—PERSONALTY

*Principal Account*

Balance, January 1, 1943. . . . . \$ 9,540.60

Receipts:

On account of Mortgages. . . . .	\$ 410.00	
Transfer from Wood Fund—Personalty Income Account	5,219.06	
Transfer from Wood Fund—Real Estate Principal Account. . . . .	15,685.55	
	21,314.61	
		\$30,855.21

Disbursements:

Investments Purchased. . . . .	22,760.94	

Balance, December 31, 1943. . . . . \$ 8,094.27

*Income Account*

Receipts:

Income from Investments. . . . .	\$ 5,489.89	
----------------------------------	-------------	--

Disbursements:

Treasurer's Commission. . . . .	\$ 267.99	
Transferred to Wood Fund—Personalty Principal Account. . . . .	5,219.06	
Fee for information on Mortgage Bondsmen. . . . .	2.00	
Postage and Insurance. . . . .	.84	
		\$ 5,489.89

## SCHEDULE V

## CASH RECEIPTS AND DISBURSEMENTS

*Year ended December 31, 1943*

## WOOD FUND—REAL ESTATE

*Principal Account*

Balance, January 1, 1943. . . . . \$12,572.47

## Receipts:

Transferred from Wood Fund—Real Estate Income Account. . . . .	\$ 3,264.33	
Sale of Stults Farm in Middlesex County, N. J. . . . .	135.00	
Fire Loss Recovery—28-42 S. 16th Street. . . . .	5.00	
		<u>3,404.33</u>
		\$15,976.80

## Disbursements:

Commission on Real Estate Sales. . . . .	\$ 218.35	
Expense re sale of Real Estate. . . . .	42.90	
Appraisal—1620 Locust Street. . . . .	25.00	
Fire Loss Repairs—28-42 S. 16th Street. . . . .	5.00	
Transferred to Wood Fund—Personalty Principal Account. . . . .	15,685.55	
		<u>\$15,976.80</u>

*Income Account*

## Receipts:

Income from Real Estate. . . . .	\$43,152.97	
Adjustment and Cancellation of Insurance. . . . .	30.97	
Refund of Taxes. . . . .	666.21	
Miscellaneous. . . . .	64.67	
		<u>\$43,914.82</u>

## Disbursements:

Taxes on Real Estate. . . . .	\$12,285.06	
Water Rents. . . . .	493.04	
Maintenance, Repairs and Insurance. . . . .	26,602.93	
Fee for Assessment Reduction. . . . .	532.06	
Treasurer's Commission. . . . .	737.40	
Transferred to Wood Fund—Real Estate Principal Account. . . . .	3,264.33	
		<u>\$43,914.82</u>

# SCHEDULE VI

## SUMMARY OF CASH

December 31, 1943

	Principal	Income	Total
<i>Unrestricted Funds:</i>			
General.....	\$ 9,295.56	\$26,339.60	\$17,044.04
Johnson Endowment.....	10,356.47	14,654.82	25,011.29
Richard A. F. Penrose, Jr.....	2,810.96	—	2,810.96
	<u>\$22,462.99</u>	<u>\$11,684.78</u>	<u>\$10,778.21</u>
<i>Semi-Restricted Funds:</i>			
Magellanic.....	—	\$ 926.57	\$ 926.57
François André Michaux.....	—	8,088.12	8,088.12
Wood Memorial—Personalty.....	\$ 8,094.27	—	8,094.27
	<u>\$ 8,094.27</u>	<u>\$ 9,014.69</u>	<u>\$17,108.96</u>
<i>Restricted Funds:</i>			
<i>Library Funds:</i>			
Thomas Balch International Law.....	—	\$ 612.67	\$ 612.67
Martin Boyé.....	—	675.13	675.13
Auguste Carlier.....	—	471.27	471.27
Carnegie Library.....	\$ 8,830.43	—	8,830.43
Benjamin Franklin.....	—	290.02	290.02
Thomas Jefferson.....	—	102.16	102.16
Joseph Parker Norris.....	—	146.05	146.05
Henry Phillips, Jr.....	—	10,675.26	10,675.26
Robert Proud.....	—	256.94	256.94
Henry Seybert.....	—	576.31	576.31
William Tilghman.....	—	284.15	284.15
	<u>\$ 8,830.43</u>	<u>\$14,089.96</u>	<u>\$22,920.39</u>
<i>Special Funds:</i>			
Judson Daland.....	3,325.16	6,315.86	9,641.02
John F. Lewis Prize.....	—	767.45	767.45
Henry M. Phillips Prize Essay.....	781.26	1,196.78	1,978.04
	<u>\$12,936.85</u>	<u>\$22,370.05</u>	<u>\$35,306.90</u>
Associated Fund.....	\$ 3,230.06	—	\$ 3,230.06
Totals.....	<u>\$46,724.17</u>	<u>\$19,699.96</u>	<u>\$66,424.13</u>
On deposit with Fidelity-Philadelphia Trust			
Company (Treasurer's Account).....			\$19,699.96
Included among the Trust Funds (Cash) of			
Fidelity-Philadelphia Trust Co.....			37,893.74
Included among the Trust Funds (Cash) of			
Girard Trust Company (Carnegie Library			
Fund).....			8,830.43
			<u>\$66,424.13</u>

# SCHEDULE VII

## GENERAL AND SPECIAL FUNDS

### PRINCIPAL

December 31, 1943

	Uninvested Cash 12-31-1943	Invested 12-31-1943	Total Funds at Book Value 12-31-1943	Total Funds at Book Value 12-31-1942
<i>Unrestricted Funds:</i>				
General:				
Manuscripts and Imprints Fund.....		\$ 13,600.27	\$ 13,600.27	
Reserve Fund for Post-War Expenditures.....		79,702.93	79,702.93	
Undesignated.....	\$ 9,295.56	920,418.92	929,714.48	
Total General Fund.	\$ 9,295.56	\$1,013,722.12	\$1,023,017.68	\$ 957,263.90
Johnson Endowment.....	10,356.47	522,599.95	532,956.42	522,356.21
Richard A. F. Penrose, Jr., Endowment.....	2,810.96	4,286,225.59	4,289,036.55	4,261,363.64
Total Unrestricted Funds.....	\$22,462.99	\$5,822,547.66	\$5,845,010.65	\$5,740,983.75
<i>Semi-Restricted Funds:</i>				
Wood Memorial:				
Personalty.....	\$ 8,094.27	\$ 131,267.34	\$ 139,361.61	\$ 115,857.00
Real Estate.....	—	545,076.00	545,076.00	558,478.47
For the construction of a building adequate to the needs of the So- ciety, any surplus re- maining to be applied to such useful purpose as counsel and officers of Society may deter- mine				
Total Semi- Restricted Funds.	\$ 8,094.27	\$ 676,343.34	\$ 684,437.61	\$ 674,335.47
<i>Restricted Funds:</i>				
Library Fund:				
Carnegie Library For maintenance of Library.....	\$ 8,830.43	\$ 87,708.29	\$ 96,538.72	\$ 100,160.07
Henry Phillips, Jr.....		491.53*	491.53	491.53
(See Associated Fund for additional \$90,892.96 in Fund).....				
Special Funds:				
Judson Daland For research in Clinical Medicine.....	3,325.16	206,373.15	209,698.31	206,159.66
Henry M. Phillips Prize Essay Prize for essay on Science and Philosophy of Ju- risprudence.....	781.26	12,412.97	13,194.23	12,664.74
Total Restricted Funds.....	\$12,936.85	\$ 306,985.94	\$ 319,922.79	\$ 319,476.00

\* Held by Pennsylvania Co., etc., as agent.



	Uninvested Cash 12-31-1943	Invested 12-31-1943	Total Funds at Book Value 12-31-1943	Total Funds at Book Value 12-31-1942
<i>Associated Fund:</i>				
Thomas Balch International Law				
For books relating to the Law of Nations.....			\$ 4,706.55	\$ 4,584.06
Martin Boyé				
For books—Chemistry and Geology.....			3,354.77	3,293.96
Charles Francis Brush Endowment				
For general purposes.....			11,163.23	10,960.87
Auguste Carlier				
For books.....			13,945.18	13,692.40
Benjamin Franklin				
For books.....			9,892.50	9,713.17
Thomas Jefferson				
For books.....			3,725.35	3,657.81
John F. Lewis Prize				
For an award to the American Citizen who shall announce at any general or special meeting of the Society and publish among its papers some truth which the Council of the Society shall deem worthy of the award.....			10,127.13	9,943.55
Magellanic Fund				
Prize for discovery or invention and for books in field of Navigation, Astronomy or National Philosophy.....			5,550.97	5,450.35
François André Michaux				
For books on Forestry.....			52,829.76	51,872.08
Joseph Parker Norris				
For books.....			4,636.79	4,552.74
Henry Phillips, Jr.				
For books on Archaeology and Philology (See Restricted Funds for Additional \$491.53 in Fund)..			90,892.96	89,242.11
Robert Proud				
For books.....			5,680.19	5,577.23
Henry Seybert				
For books.....			3,807.41	3,738.38
William Tilghman				
For books.....			2,025.87	1,989.15
Whitfield Fund				
For general purposes.....			44,988.77	44,173.23
Total Associated Fund	\$ 3,230.06	\$ 264,097.37	\$ 267,327.43	\$ 262,441.09
Total All Funds.....	\$46,724.17	\$7,069,974.31	\$7,116,698.48	\$6,997,236.31

	Uninvested Cash 12-31-1943	Invested 12-31-1943	Total Funds at Book Value 12-31-1943	Total Funds at Book Value 12-31-1942
Brought forward—Total all Funds.....	\$46,724.17	\$7,069,974.31	\$7,116,698.48	\$6,997,236.31
Invested in:				
U. S. Government Obligations.....			\$1,784,633.75	\$1,781,321.25
Foreign Government Bonds.....			168,957.00	99,000.00
State, County and Municipal Bonds.....			361,956.25	488,826.25
Railway, Utility, Industrial and Other Bonds.....			1,728,113.25	1,715,361.66
Stocks.....			2,410,852.94	2,218,050.98
Mortgages and Mortgage Participations.....			46,222.43	53,712.25
Real Estate and Real Estate Participations.....			565,701.86	571,855.31
Perpetual Fire Insurance Policies (including prepaid value—Fine Arts Policy).....			3,045.30	4,250.60
Sundry Assets—Held by Pennsylvania Co., etc.....			491.53	491.53
			\$7,069,974.31	\$6,932,869.83
Uninvested Cash.....			46,724.17	64,366.48
			<u>\$7,116,698.48</u>	<u>\$6,997,236.31</u>

## SUMMARY OF INCREASE IN INVESTMENTS

Balance at Book Value 12-31-1942.....	\$6,932,869.83
Add:	
Gain on Sale of Real Estate.....	1,900.00
Stock Dividend of 37 shares of American Cyanamid Co. 5% Cum. Preference received on 500 shares American Cyanamid Co. class B Common.....	420.87
Investments purchased at cost.....	1,090,661.69
	<u>\$8,025,852.39</u>
Deduct:	
Investments sold (\$977,375.49) at book value.....	\$955,221.97
Premiums charged off on Bonds purchased.....	316.11
Cost of Exchange—City of Philadelphia Bonds—other than Associated Fund.....	340.00
	<u>955,878.08</u>
Balance at Book Value 12-31-1943.....	<u>\$7,069,974.31</u>

## SCHEDULE VIII

## BUILDING FUND—GIRARD TRUST COMPANY, TRUSTEE

## CASH RECEIPTS AND DISBURSEMENTS

*Year ended December 31, 1943**Principal Account*

Balance, January 1, 1943..... \$ 4,098.56

## Receipts:

Investment in Bonds sold or redeemed.....	\$100,097.64	
On Account of Mortgages.....	12,849.29	
Real Estate sold, etc.....	11,413.75	
Transferred from Income Account.....	17,228.96	
	<u>141,589.64</u>	
		\$145,688.20

## Disbursements:

Invested in Bonds.....	\$113,267.04	
Invested in Mortgage Participation.....	5,000.00	
Transferred to Fidelity-Philadelphia Trust Company, Treasurer (General Fund) in reimbursement for alterations and furnishing of Society's building, etc.	1,482.69	
Costs, Real Estate Sales, Foreclosures, etc....	549.79	
Forwarding Charges and Appraisal Fee.....	10.79	
	<u>120,310.31</u>	

Balance, December 31, 1943..... \$ 25,377.89*Income Account*

## Receipts:

Income from Investments.....	\$ 21,118.50	
Estate of Henry G. Bryant, Deceased—on account of income.....	39.18	
Insurance Refunds on Real Estate Sold.....	43.45	
	<u>\$ 21,201.13</u>	

## Disbursements:

Real Estate Expenses.....	\$ 2,311.61	
Commission—Girard Trust Company.....	771.96	
Postage, Insurance and Notary Fee.....	4.62	
Transferred to Principal Account.....	17,228.96	
Accrued Interest on Bonds Purchased.....	883.98	
	<u>\$ 21,201.13</u>	

## SCHEDULE IX

## BUILDING FUND—GIRARD TRUST COMPANY, TRUSTEE

## SUMMARY OF ASSETS

	Balance 1-1-1943	Additions	Deductions	Balance 12-31-1943
Pledges Receivable.....	\$ 11,229.17	—	—	\$ 11,229.17
Investments:				
Bonds (Par Value).....	342,000.00	\$115,000.00	\$102,500.00	354,500.00
Stocks (At Cost).....	49,644.13	—	—	49,644.13
Mortgages (Participations).....	139,164.53	5,000.00	12,849.29 6,500.00*	124,815.24
Real Estate (Participations).....	100,278.37	549.79 6,500.00*	29,356.31	77,971.85
Cash—Principal.....	4,098.56	141,589.64	120,310.31	25,377.89
Cash—Income.....	—	21,201.13	21,201.13	—
	<u>\$646,414.76</u>	<u>\$289,840.56</u>	<u>\$292,717.04</u>	<u>\$643,538.28†</u>

## SUMMARY OF DECREASE IN FUND

*Year ended December 31, 1943*

Income from Investments.....	\$21,118.50	
Less:		
Accrued Interest on Bonds Purchased....	883.98	
		\$20,234.52
Discount on Bonds Purchased (Net of Premiums Paid).....		1,732.96
Estate of Henry G. Bryant, Deceased—on account of Income.....		39.18
Insurance Refunds on Real Estate Sold.....		43.45
		<u>\$ 22,050.11</u>
Less:		
Loss on sale of Real Estate.....		\$17,942.56
Loss on sale of Bonds, Net.....		2,402.36
Real Estate Expenses.....		2,311.61
Transferred to Fidelity-Philadelphia Trust Company, Treasurer (General Fund), in reimbursement for alterations and furnishing of Society's building, etc..	1,482.69	
Commission—Girard Trust Company.....	771.96	
Postage, Insurance, etc.....	9.71	
Appraisal and Notary Fees.....	5.70	
		<u>\$ 24,926.59</u>
Decrease in Fund.....		\$ 2,876.48
Balance, January 1, 1943.....		646,414.76
Balance, December 31, 1943.....		<u>\$643,538.28</u>

\* Face value of mortgage foreclosed and real estate acquired.

† Includes bonds at Par Value. Total Fund including bonds at cost is \$639,046.96.

## VI

### AWARDS OF PRIZES

MAGELLANIC FUND, established in 1786 by the gift of 200 guineas by John Hyacinth de Magellan, of London, for a gold medal to be annually awarded under prescribed terms, to the author of the best discovery or most useful invention relating to navigation, astronomy, or natural philosophy (mere natural history only excepted). Any surplus of interest remaining to be used for such purposes as may be authorized under the Society's Charter and Laws.

#### *Awards of the Magellanic Premium*

December 1790. To FRANCIS HOPKINSON, Philadelphia, Penna. For the Invention of the Spring Block. "Description of a Spring Block Designed to Assist a Vessel in Sailing" (TRANS. Amer. Philos. Soc. 3, Art. 40, 1793).

December 1792. To ROBERT PATTERSON, Philadelphia, Penna. For the Improvement of Electrical Rods, or Lightning Conductors, by Pointing them with Black-lead. "An Improvement on Metallic Conductors or Lightning-rods in a Letter to Dr. David Rittenhouse from Robert Patterson" (TRANS. Amer. Philos. Soc. 3, Art. 35, 1793).

December 1792. To WILLIAM THORNTON, London, England. For "Cadmus" or a Philosophical Dissertation on the Elements of Written Language. "Cadmus, or a Treatise on the Elements of Written Language, illustrating, by a Philosophical Division of Speech, the power of each Character, thereby mutually fixing the Orthography and Orthoepey. With an Essay on the Mode of Teaching the Surd, or Deaf and Consequently Dumb to Speak" (TRANS. Amer. Philos. Soc. 3, Art. 33, 1793).

December 1794. To NICOLAS COLLIN, Philadelphia, Penna. For a Paper on an Elevator (Nititor [sic] in ardua virtus). "Description of a Speedy Elevator by the Inventor" (TRANS. Amer. Philos. Soc. 4, Art. 75, 1799).

November 1804. To CAPTAIN WILLIAM MUGFORD, Salem, Mass. For the Invention of a Temporary Rudder. "An account and description of a Temporary Rudder Invented by Capt. William Mugford of Salem, Mass." (TRANS. Amer. Philos. Soc. 6, Art. 34, 1809).

- December 1804. To DR. BEN SMITH BARTON, Philadelphia, Penna. For a Paper on a "Number of the Pernicious Insects of the United States."
- October 1807. To JOHN GARNETT, New Brunswick, N. J. For a Paper on "A New Simple Nautical Chart." "Description and use of a new and simple Nautical Chart, for working the different problems in Navigation" (TRANS. Amer. Philos. Soc. 6, Art. 49, 1809).
- April 1809. To JAMES HUMPHRIES, JR., Philadelphia, Penna. For a Model and Description of Steering Apparatus.
- April 1820. To JOSHUA CHAPMAN, Bristol, Penna. For an Improvement in the Manufacture of Canvas.
- March 1823. To DR. JAS. EWING, Philadelphia, Penna. For the invention of the "Improved Hydrant."
- May 1825. To C. C. BRODIE. For an invention to repair the side of ships, under the surface of the water.
- March 1836. To JAMES P. ESPY, Philadelphia, Penna. Author of the paper signed "Investigator."
- December 1864. To PLINY EARLE CHASE, Philadelphia, Penna. For a paper on "The discovery of Certain new relations between the solar- and lunar-diurnal variations of magnetic force and of barometric pressure" (PROC. Amer. Philos. Soc. 9: 487-495).
- December 1887. To LEWIS M. HAUPT, Philadelphia, Penna. For a paper on "The Physical Phenomena of Harbor Entrances. Their Causes and Remedies. Defects of Present Methods of Improvement" (PROC. Amer. Philos. Soc. 25: 19-41).
- April 1922. To PAUL R. HEYL AND LYMAN J. BRIGGS, U. S. Bureau of Standards, Washington, D. C. For the invention of the Earth Inductor Compass. "The Earth Inductor Compass" (PROC. Amer. Philos. Soc. 61: 15-32).

PHILLIPS PRIZE ESSAY FUND, established in 1888 by the gift of \$5,000 by Miss Emily Phillips, of Philadelphia, in memory of her brother, Henry M. Phillips. Income to be used in the awarding of a prize for the best essay of real merit on the science and philosophy of jurisprudence.

*Awards of the Henry M. Phillips Prize Essay*

- May 1895. To GEORGE H. SMITH, Esq., Los Angeles, Calif. \$500. "The Theory of State" (PROC. Amer. Philos. Soc. 34: 181-334).

- June 1900. To W. H. HASTINGS, Esq., Wilber, Neb. \$2,000. "The Development of Law as Illustrated by the Decisions Relating to the Police Power of the State" (Proc. Amer. Philos. Soc. 39: 359-554).
- April 1912. To CHARLES H. BURR, Esq., Philadelphia, Penna. \$2,000. "The Treaty-Making Power of the United States and the Methods of its Enforcement as Affecting the Police Powers of the States" (Proc. Amer. Philos. Soc. 51: 271-422).
- April 1921. To QUINCY WRIGHT, Esq., Minneapolis, Minn. \$2,000. "The Relative Rights, Duties and Responsibilities of the President, of the Senate and the House, and of the Judiciary in Theory and Practice" (Proc. Amer. Philos. Soc. 60: 99-455).
- October 1935. To LON L. FULLER, Dean of the Law School, Duke University, Durham, N. C. \$1,500 and Diploma. "American Legal Realism" (Proc. Amer. Philos. Soc. 76: 191-235).
- April 1942. To EDWARD S. CORWIN, Princeton University, Princeton, N. J. \$1,500 and Diploma. *The President: Office and Powers*, and his articles on "American Constitutional Law."

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LEWIS FUND, established in 1935 by the gift of Mrs. John F. Lewis, of Philadelphia, of \$10,000 in memory of her late husband; the income to be used each year as an award to the American citizen who shall announce at any general or special meeting of the Society, and publish among its papers, some truth which the Council of the Society shall deem worthy of the award.

*Awards of the John F. Lewis Prize*

- April 1937. To RALPH E. CLELAND, Goucher College, Baltimore, Md. \$300 and Diploma, for presentation to the Society and publishing in its PROCEEDINGS: "Cyto-taxonomic Studies on Certain *Oenotheras* from California" (Read April 19, 1934,—Proc. Amer. Philos. Soc. 75: 339-429). "A Cyto-genetic and Taxonomic Attack upon the Phylogeny and Systematics of *Oenothera* (Evening Primrose) with Special Reference to the Sub-genus *Onagra*" (Read April 18, 1935,—Proc. Amer. Philos. Soc. 77: 477-544).
- April 1938. To ARTHUR J. DEMPSTER, University of Chicago, Chicago, Ill. \$300 and Diploma, for presentation to the Society and publishing in its PROCEEDINGS: "New Methods in Mass Spectroscopy" (Read in part April 20, 1935,—Proc. Amer. Philos. Soc. 75: 755-767). "Further Experiments on the Mass Analysis of the Chemical Elements" (Read April 25, 1936,—Proc. Amer. Philos. Soc. 76: 491-496).

- April 1939. To HENRY NORRIS RUSSELL, Princeton University Observatory, Princeton, N. J. \$300 and Diploma, for presentation to the Society and publishing in its PROCEEDINGS: "Stellar Energy" (Read February 17, 1939,—PROC. Amer. Philos. Soc. 81: 295-307).
- April 1940. To EARLE RADCLIFFE CALEY, Princeton University, Princeton, N. J. \$300 and Diploma, for presentation to the Society and publishing in its MEMOIRS: "The Composition of Ancient Greek Bronze Coins" (Read November 27, 1937,—MEM. Amer. Philos. Soc. 11: 1-203).
- April 1941. To GEORGE HOWARD PARKER, Professor Emeritus of Zoology, Harvard University, Cambridge, Mass. \$300 and Diploma, for presentation to the Society and publishing in its PROCEEDINGS: "Integumentary Color Changes of Elasmobranch Fishes especially of *Mustelus*" (Read November 26, 1936,—PROC. Amer. Philos. Soc. 77: 223-247). "Melanophore Responses and Blood Supply (Vasomotor Changes)" (Read November 27, 1937,—PROC. Amer. Philos. Soc. 78: 513-527). "On the Neurohumors of the Color Changes in Catfishes and on Fats and Oils as Protective Agents for such Substances" (Read April 18, 1940,—PROC. Amer. Philos. Soc. 83: 379-408).
- April 1943. To GEORGE GAYLORD SIMPSON, Associate Curator of Vertebrate Paleontology, American Museum of Natural History, for presentation to the Society and publishing in its PROCEEDINGS: "The Beginnings of Vertebrate Paleontology in North America" (Read February 14, 1942,—PROC. Amer. Philos. Soc. 86: 130-188).



## VII

### GENERAL MEETING LECTURES

#### THE R. A. F. PENROSE, JR., LECTURES

- 1934. Edwin G. Conklin, "A Generation's Progress in the Study of Evolution"
  - 1935. W. F. G. Swann, "Is the Universe Running Down?"
  - 1936. Dixon Ryan Fox, "The American Tradition in a New Day"
  - 1937. Irving Langmuir, "The Surfaces of Solids and Liquids"
  - 1938. S. A. Mitchell, "With an Astronomer on an Eclipse Expedition"
  - 1939. Eduard Beneš,\* "Politics as Art and Science"
  - 1940. Archibald MacLeish, "Writers and Scholars"
  - 1941. Edward C. Tolman, "Motivation, Learning, and Adjustment"
  - 1942. James R. Angell, "The Problem of Education in a World at War"
  - 1943. Carl L. Becker, "What is Still Living in the Political Philosophy of Thomas Jefferson?"
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#### SPECIAL LECTURES

- November 1936. D'Arcy W. Thompson, "Astronomy in the Classics"
- February 1937. Frederick P. Keppel, "The Responsibility of Endowments in the Promotion of Knowledge"
- November 1937. William Lyon Phelps,\* "Truth and Poetry"
- February 1938. Dumas Malone, "The Scholar and the Public"
- Donald P. Bean, "The Riddle of Research"
- November 1938. Alfred J. Lotka, "Contacts of Population Study with Related Branches of Science"
- February 1939. Henry Norris Russell, "Stellar Energy and the Evolution of Atoms"

\* Franklin Medal presented.

- November 1939. Carlton J. H. Hayes, "The Novelty of Totalitarianism in the History of Western Civilization"
- February 1940. Laurence M. Gould, "Glaciers of the Antarctic"
- April 1940. Dayton C. Miller, "The Pipes of Pan, Old and New"
- November 1940. Edward S. Corwin,\* "Some Aspects of the Presidency"
- February 1941. John A. Fleming, "Geomagnetism: World-Wide and Cosmic Aspects with Especial Reference to Early Research in America"
- April 1941. Hugh S. Taylor,\* "Large Molecules Through Atomic Spectacles"
- November 1941. Vilhjalmur Stefansson, "Military Aspects of the Arctic"
- April 1942. Sylvanus Griswold Morley,† "The Carnegie Institution's Work in Central America and Mexico"
- November 1942. John Dickinson, "The Philosophy of Government in Our Earlier and Later History"
- November 1943. James B. Conant,\* "The Advancement of Learning in the United States in the Post-War World."

† Erroneously reported in the Year Book for 1942, p. 250.

## VIII

### REPRESENTATION AT CELEBRATIONS OF SOCIETIES, INSTITUTIONS, ETC.

- January 9. The Penn Mutual Life Insurance Company, Celebration of the One Hundred and Fiftieth Anniversary of the first air voyage in America, the Jean Pierre Blanchard hydrogen balloon ascension of 1793 which started from the yard of the old Walnut Street Prison in Philadelphia. William E. Lingelbach.
- March 25-26. Conference on Inter-American Affairs, Committee on Inter-American Studies, University of Pennsylvania. Frank Aydelotte.
- April 9-10. Forty-seventh Annual Meeting of the American Academy of Political and Social Sciences, Philadelphia. Nathan Hayward, John Story Jenks, and Marshall S. Morgan.
- May 3. Centennial Convocation commemorating the Founding of Villanova College. Edwin G. Conklin.
- May 24. The Kosciuszko Foundation, The Copernican Quadricentennial Celebration. Edwin G. Conklin.
- December 7. Inauguration of Clark George Kuebler, as President of Ripon College. Anton J. Carlson.
- December. University of Algiers, Bicentennial Celebration of the Birth of Antoine Laurent Lavoisier. Greetings were sent. American Documentation Institute. Jacob R. Schramm, 1941-43. American Council of Learned Societies, Washington, D. C. Guy Stanton Ford, 1942-44; William E. Lingelbach, 1942-46. National Research Council, Division of Foreign Relations, Washington, D. C. Detlev W. Bronk, 1942-45. American Year Book Corporation, Supervisory Board. Gilbert Chinard, 1943-.

# IX

## LIST OF MEMBERS

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### MEMBERS RESIDING WITHIN THE UNITED STATES

	Date of Election
Abbot, Charles Greeley, M.Sc., D.Sc., LL.D. Astrophysicist, Secretary, Smithsonian Institution, Washington 25, D. C.	1914
Adams, Edwin Plimpton, M.S., Ph.D., Sc.D. Professor of Physics, Princeton University, Princeton, N. J.	1915
Adams, James Truslow, A.M., LL.D., Litt.D., L.H.D. Author, American Historian. Sheffield House, Southport, Conn.	1938
Adams, Joseph Quincy, Ph.D., Litt.D. Director, Folger Shakespeare Library. 2915 Foxhall Road, N.W., Washington 16, D. C.	1940
Adams, Roger, A.B., A.M., Ph.D., Sc.D. Head of the Chemistry Department, University of Illinois. 603 Michigan Avenue, Urbana, Ill.	1935
Adams, Walter Sydney, A.M., Sc.D., LL.D. Astronomer, Director, Mount Wilson Observatory, Pasadena 4, Calif.	1915
Aitken, Robert Grant, A.M., Sc.D., LL.D. Astronomer, Director Emeritus, Lick Observatory. 1109 Spruce Street, Berkeley 7, Calif.	1919
Albright, William F., Ph.D., Litt.D., D.H.L., Th.D. Orientalist and Archaeologist, Professor of Semitic Languages, Johns Hopkins University, Baltimore 18, Md.	1929
Alexander, James W., A.M., Ph.D., A.A. Professor of Mathematics, Institute for Advanced Study. 29 Cleveland Lane, Princeton, N. J.	1928

	Date of Election
<b>Allen, Charles Elmer, Ph.D., Sc.D.</b> Professor Emeritus of Botany, University of Wisconsin. 2014 Chamberlin Avenue, Madison 5, Wis.	1922
<b>Anderson, Carl David, Ph.D.</b> Professor of Physics, California Institute of Technology, Pasadena 4, Calif.	1938
<b>Andrews, Donald Hatch, A.B., Ph.D.</b> Chairman, Chemistry Department, Director, Chemistry Laboratory, Johns Hopkins University. 204 Southway, Guilford, Baltimore 18, Md.	1933
<b>Andrews, Roy Chapman, A.B., A.M., Sc.D.</b> Zoologist, Honorary Director, American Museum of Natural History. Colebrook, Conn.	1927
<b>Angell, James Rowland, A.B., A.M., Ph.D., Litt.D., LL.D.</b> Psychologist, President Emeritus, Yale University; Educational Counselor, National Broadcasting Company. 155 Blake Road, Hamden, New Haven, Conn.	1924
<b>†Armstrong, Edward Cooke, A.B., Ph.D., LL.D., L.H.D.</b> Professor of French Language, Princeton University. 26 Edgehill Street, Princeton, N. J.	1932
<b>Armstrong, Hamilton Fish, A.B.</b> Writer; Editor, <i>Foreign Affairs</i> . 45 East 65th Street, New York 21, N. Y.	1940
<b>Aydelotte, Frank, A.M., B.Litt., L.H.D., LL.D., D.Litt., D.C.L.</b> Director, Institute for Advanced Study, Princeton, N. J.	1923
<b>‡Baekeland, Leo H., D.Sc., D.Nat.Sc., D.Ch., D.Ap.Sc., LL.D.</b> Chemist, Former President, Bakelite Corporation. 30 East 42nd Street, New York, N. Y.	1935
<b>Bailey, Irving Widmer, A.B., M.F., Sc.D.</b> Professor of Plant Anatomy, Harvard University. 17 Buckingham Street, Cambridge 38, Mass.	1926

† Deceased March 5, 1944.

‡ Deceased February 23, 1944.

	Date of Election
<b>Bailey, Liberty Hyde, Litt.D., LL.D.</b> Botanist, Professor Emeritus of Agriculture (Horticulture), Director (ret.), Bailey Hortorium, Cornell University, Ithaca, N. Y.	1896
<b>Bancroft, Wilder Dwight, A.B., Ph.D., Sc.D., LL.D.</b> Professor Emeritus of Physical Chemistry, Cornell University. 7 East Avenue, Ithaca, N. Y.	1920
<b>Barbour, Thomas, Ph.D., Sc.D., S.D., Dr. en Ciencias</b> Director, University Museum and Museum of Comparative Zoology, Professor of Zoology, Harvard University, Cambridge 38, Mass.	1937
<b>Barnard, Chester Irving, Sc.D., LL.D.</b> Economist and Administrator, President, New Jersey Bell Telephone Company. 540 Broad Street, Newark 1, N. J.	1943
<b>Bartlett, Harley Harris, A.B.</b> Chairman, Department of Botany, Director, Botanical Garden, University of Michigan. 538 Church Street, Ann Arbor, Mich.	1929
<b>Bateman, Harry, M.A., Ph.D.</b> Professor of Mathematics, Theoretical Physics and Aeronautics, California Institute of Technology, Pasadena 4, Calif.	1924
<b>Beams, Jesse Wakefield, Ph.D.</b> Professor of Physics, University of Virginia. Monroe Hill, University, Va.	1939
<b>Beard, Charles Austin, LL.D., Ph.D.</b> Historian, Formerly Professor of Politics, Columbia University. New Milford, Conn.	1936
<b>Becker, Carl L., Ph.D., Litt.D.</b> Professor Emeritus of History, Cornell University. 109 West Upland Road, Ithaca, N. Y.	1936
<b>Beeson, Charles Henry, Ph.D.</b> Professor of Latin, University of Chicago. 1228 East 56th Street, Chicago 37, Ill.	1940

	Date of Election
<b>Bell, Eric Temple, Ph.D.</b> Professor of Mathematics, California Institute of Technology. 434 South Michigan Avenue, Pasadena 5, Calif.	1937
<b>Benedict, Francis Gano, Ph.D., Sc.D., M.D.</b> Physiologist, Director (ret.), Nutrition Laboratory, Carnegie Institution of Washington (1907-37). Machiasport, Maine.	1910
<b>Berkey, Charles Peter, B.S., M.S., Ph.D., Sc.D.</b> Newberry Professor Emeritus of Geology, Columbia University, New York 27, N. Y.	1928
<b>Berry, Edward Wilber</b> Professor of Paleontology, Dean, Provost, Johns Hopkins University, Baltimore 18, Md.	1919
<b>Bigelow, Henry Bryant, Ph.D.</b> Director, Woods Hole Oceanographic Institution; Professor of Zoology, Harvard University. Museum of Comparative Zoology, Cambridge 38, Mass.	1937
<b>Birge, Edward Asahel, Ph.D., LL.D., Sc.D.</b> Zoologist, President Emeritus, University of Wisconsin. 2011 Van Hise Avenue, Madison, Wis.	1923
<b>Birge, Raymond Thayer, A.M., Ph.D.</b> Professor of Physics, University of California. 1639 La Vereda Street, Berkeley 4, Calif.	1943
<b>Birkhoff, George David, Ph.D., S.D., D. (hon.), LL.D.</b> Perkins Professor of Mathematics, Harvard University. 987 Memorial Drive, Cambridge, Mass.	1921
<b>Blackwelder, Eliot, Ph.D.</b> Professor and Executive Head, Department of Geology, Stanford University, Calif.	1939
<b>Blakeslee, Albert Francis, B.A., M.A., Ph.D., D.Sc.</b> Visiting Professor of Botany, Director, Genetics Experi- ment Station, Smith College, Northampton, Mass.	1924
<b>Blegen, Carl William, Ph.D., M.A.</b> Professor of Classical Archaeology, Fellow of the Graduate School of Arts and Sciences, University of Cincinnati. 1660 Lanier Place, Washington 9, D.C.	1941

	Date of Election
<b>Bliss, Gilbert Ames, B.S., M.S., Ph.D., Sc.D.</b> Professor Emeritus of Mathematics, University of Chicago, Chicago 15, Ill.	1926
<b>Bloomfield, Leonard, Ph.D.</b> Professor of Linguistics, Yale University, New Haven 11, Conn.	1942
<b>Bogert, Marston Taylor, A.B., Ph.B., Sc.D., LL.D., R.N.D.</b> Professor Emeritus of Organic Chemistry, Columbia University, New York 27, N. Y.	1909
<b>Bolton, Herbert Eugene, Ph.D., D.Litt., L.H.D., LL.D.</b> Sather Professor of History, Chairman, Department of History, Director, Bancroft Library, University of California, Berkeley 4, Calif.	1937
<b>Bonner, Campbell, A.M., Ph.D.</b> Professor of the Greek Language and Literature, University of Michigan. 1025 Martin Place, Ann Arbor, Mich.	1938
<b>Bowen, Ira Sprague, Ph.D.</b> Professor of Physics, California Institute of Technology, Pasadena 4, Calif.	1940
<b>Bowen, Norman L., M.A., B.Sc., Ph.D., Sc.D., LL.D.</b> Geologist, Charles L. Hutchinson Distinguished Service Professor of Petrology, University of Chicago, Chicago 15, Ill.	1930
<b>Bowman, Isaiah, B.S., Ph.D., M.A., D.Sc., LL.D.</b> Geographer, President, Johns Hopkins University, Baltimore 18, Md.	1923
<b>Boyd, Julian Parks, A.B., A.M., D.Litt.</b> Librarian, Princeton University Library, Princeton, N. J.	1943
<b>Bridgman, Percy Williams, A.M., Ph.D., Sc.D.</b> Physicist, Hollis Professor of Mathematics and Natural Philosophy, Harvard University. Research Laboratory of Physics, Cambridge 38, Mass.	1916
<b>Briggs, Lyman J., Ph.D., Sc.D., D.Eng., LL.D.</b> Physicist, Director, National Bureau of Standards. 3208 Newark Street, Cleveland Park, Washington 8, D. C.	1935



	Date of Election
<b>Bronk, Detlev W., M.S., Ph.D., Sc.D.</b> Professor of Biophysics, Director, Eldridge Reeves Johnson Foundation for Medical Physics, University of Pennsylvania, Philadelphia 4, Pa.	1934
<b>Brooke, C. F. Tucker, M.A., B.Litt., Litt.D.</b> Sterling Professor of English, Yale University. 88 Cold Spring Street, New Haven 11, Conn.	1938
<b>Brooks, Van Wyck, Litt.D.</b> Author and Literary Historian. Westport, Conn.	1939
<b>Bryant, William L.</b> Paleontologist, Director, Park Museum, Providence 5, R. I.	1935
<b>Buck, Carl Darling, A.B., Ph.D., Litt.D.</b> Professor Emeritus of Comparative Philology, University of Chicago. 5609 Kenwood Avenue, Chicago 37, Ill.	1923
<b>Buckley, Oliver Ellsworth, B.S., D.Sc., Ph.D.</b> Physicist and Engineer, President, Bell Telephone Laboratories, 463 West Street, New York 14, N. Y.	1942
<b>Buddington, Arthur F., Ph.D., Sc.D.</b> Professor of Geology, Chairman, Department of Geology, Princeton University, Princeton, N. J.	1931
<b>Burgess, Warren Randolph, Ph.D., LL.D.</b> Banker and Statistician, Vice Chairman, National City Bank of New York. 30 West 54th Street, New York 19, N. Y.	1942
<b>Bush, Vannevar, Sc.D., Eng.D., LL.D.</b> Engineer, President, Carnegie Institution of Washington, Washington, D. C.	1937
<b>Butler, Nicholas Murray, Ph.D., LL.D.</b> President, Columbia University, New York 27, N. Y.	1938
<b>Byrd, Richard Evelyn, D.Eng., Sc.D., LL.D.</b> Geographer, Navigator, Rear-Admiral (ret.), United States Navy. 9 Brimmer Street, Boston, Mass.	1930
<b>Calvert, Philip Powell, Ph.D.</b> Professor Emeritus of Zoology, University of Pennsylvania. P. O. Box 14, Cheyney, Pa.	1918

	Date of Election
<b>Campbell, Douglas Houghton, Ph.D., LL.D.</b> Professor Emeritus of Botany, Stanford University, Calif.	1910
<b>Cannon, Walter Bradford, A.M., M.D., Sc.D., LL.D., Dr. (hon.)</b> George Higginson Professor of Physiology, Harvard Medical School, Boston 38, Mass.	1908
<b>Capps, Edward, Ph.D., LL.D., Litt.D., L.H.D.</b> Professor Emeritus of Classics, Princeton University. 42 Mercer Street, Princeton, N. J.	1920
<b>Carlson, Anton Julius, A.M., Ph.D., M.D., LL.D.</b> Professor of Physiology, University of Chicago. 5228 Greenwood Avenue, Chicago, Ill.	1928
<b>Carmichael, Leonard, Ph.D., Sc.D., Litt.D., LL.D.</b> Psychologist, President, Tufts College, Medford 55, Mass.	1942
<b>Carpenter, Rhys, Ph.D., Litt.D.</b> Professor of Archaeology, Bryn Mawr College. Jerry Run, R.D. 2, Downingtown, Pa.	1935
<b>Carrel, Alexis, M.D., Sc.D., LL.D.</b> Surgeon, Biologist, Member Emeritus, Rockefeller Institute for Medical Research, 66th Street and York Avenue, New York 21, N. Y.	1909
<b>Case, Ermine Cowles, A.B., A.M., M.S., Ph.D.</b> Professor Emeritus of Historical Geology and Paleontology, University of Michigan, Ann Arbor, Mich.	1931
<b>Castle, William Bosworth, M.D., S.M.</b> Professor of Medicine, Harvard Medical School; Associate Director, Thorndike Memorial Laboratory and Director, Second and Fourth Medical Services (Harvard), Boston City Hospital, Boston 18, Mass.	1939
<b>Castle, William Ernest, A.M., Ph.D., Sc.D., LL.D.</b> Professor Emeritus of Genetics, Harvard University; Research Associate in Genetics, University of California. Hilgard Hall, Berkeley 4, Calif.	1910
<b>Cather, Willa, Litt.D., LL.D.</b> Author. Care A. A. Knopf, 501 Madison Avenue, New York 22, N. Y.	1934

## LIST OF MEMBERS

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	Date of Election
†Cattell, James McKeen, Ph.D., LL.D., D.H.L., Sc.D. Psychologist, Editor. Garrison, N. Y.	1888
Chamberlain, Joseph Perkins, Ph.D., LL.D. Professor of Public Law, Columbia University. 8 Sutton Square, New York 22, N. Y.	1940
Chamberlin, Rollin Thomas, Ph.D., Sc.D. Professor of Geology, University of Chicago. 9300 Pleasant Avenue, Chicago 20, Ill.	1943
Chaney, Ralph Works, B.S., Ph.D. Professor of Paleontology and Curator of Paleobotanical Collections, University of California; also Research Associate, Carnegie Institution of Washington. Berkeley 4, Calif.	1943
Chapman, Frank Michler, Sc.D. Curator in Ornithology, American Museum of Natural History. Coconut Grove, Fla.	1921
Chase, George Henry, A.B., A.M., Ph.D., L.H.D., Litt.D. Professor of Archaeology, Dean of the University, Harvard University. 1 Bryant Street, Cambridge 38, Mass.	1929
Cheyney, Edward Potts, A.M., Litt.D., LL.D. Professor Emeritus of European History, University of Pennsylvania. R.F.D. 3, Media, Pa.	1904
Chinard, Gilbert, B.L., L.èsL., LL.D. Professor of French Literature, Princeton University. 93 Mercer Street, Princeton, N. J.	1932
Clark, William Mansfield, Ph.D., Sc.D. De Lamar Professor of Physiological Chemistry, Johns Hopkins University, School of Medicine, Baltimore 18, Md.	1939
Clarke, Hans Thacher, D.Sc. Professor of Biochemistry, College of Physicians and Surgeons, Columbia University. 630 W. 168th Street, New York 32, N. Y.	1943

† Deceased January 20, 1944.

	Date of Election
<b>Cleland, Ralph Erskine, A.B., M.S., Ph.D.</b> Professor and Head, Department of Botany and Bacteriology, Indiana University, Bloomington, Ind.	1932
<b>Coble, Arthur Byron, Ph.D., LL.D.</b> Professor of Mathematics, University of Illinois. 702 W. Washington Boulevard, Urbana, Ill.	1939
<b>Cockerell, Theodore Dru Alison, D.Sc.</b> Professor Emeritus of Zoology, University of Colorado. 908 10th Street, Boulder, Colo.	1928
<b>Cole, Fay-Cooper, Ph.D., Sc.D.</b> Professor of Anthropology, Chairman of the Department, University of Chicago. 5626 Dorchester Avenue, Chicago 37, Ill.	1941
<b>Commons, John Rogers, LL.D.</b> Professor of Economics (ret.), University of Wisconsin. P. O. 1498, Ft. Lauderdale, Fla.	1936
<b>Compton, Arthur Holly, B.Sc., Ph.D., Sc.D., LL.D.</b> Professor of Physics, University of Chicago. 5637 Woodlawn Avenue, Chicago 37, Ill.	1925
<b>Compton, Karl Taylor, Ph.D., Sc.D., D.Eng., LL.D.</b> Physicist, President, Massachusetts Institute of Technology, Cambridge 39, Mass.	1923
<b>Conant, James Bryant, Ph.D., LL.D.</b> Chemist, President, Harvard University. 17 Quincy Street, Cambridge 38, Mass.	1935
<b>Conklin, Edwin Grant, Ph.D., Sc.D., LL.D.</b> Professor Emeritus of Biology, Princeton University, Princeton, N. J.	1897
<b>Coolidge, William David, Ph.D., Sc.D.</b> Physicist, Director, Research Laboratories of the General Electric Company. 1480 Lenox Road, Schenectady, N. Y.	1938
<b>Corner, George Washington, M.D.</b> Director, Department of Embryology, Carnegie Institution of Washington, Wolfe and Madison Streets, Baltimore 5, Md.	1940

	Date of Election
<b>Corwin, Edward Samuel, Ph.D., LL.D., Litt.D.</b> Professor of Jurisprudence, Princeton University, Princeton, N. J.	1936
<b>Cottrell, Frederick Gardner, Ph.D., LL.D.</b> Chemist, Consultant to Research Corporation, New York. 3904 Ingomar Street, N.W., Washington, D. C.	1938
<b>Crane, Robert Treat, Ph.D., LL.B.</b> Executive Director, Social Science Research Council. 1165 Fifth Avenue, New York 29, N. Y.	1941
<b>Cret, Paul Philippe, Sc.D., M.A., D.A.</b> Architect, Professor Emeritus of Design, University of Pennsylvania. 1518 Walnut Street, Philadelphia 2, Pa.	1928
<b>Crew, Henry, Ph.D.</b> Professor Emeritus of Physics, Northwestern University. 620 Library Place, Evanston, Ill.	1921
<b>Crocker, William, A.B., A.M., Ph.D.</b> Botanist, Managing Director, Boyce Thompson Institute for Plant Research, Inc. 1086 North Broadway, Yonkers 3, N. Y.	1931
<b>Cross, Whitman, B.S., Ph.D., Sc.D.</b> Geologist, United States Geological Survey (ret.). 101 East Kirke Street, Chevy Chase 15, Md.	1915
<b>Cross, Wilbur L., A.B., Ph.D., Litt.D., L.H.D., LL.D.</b> Governor of Connecticut (1932-38); Professor Emeritus of English, Yale University; Editor of <i>The Yale Review</i> . 24 Edgehill Road, New Haven, Conn.	1934
<b>Dahlgren, Ulric, A.B., M.S.</b> Professor Emeritus of Biology, Princeton University. 7 Evelyn Place, Princeton, N. J.	1919
<b>Daly, Reginald Aldworth, A.M., Ph.D., Sc.D.</b> Professor of Geology, Harvard University. 23 Hawthorn Street, Cambridge 38, Mass.	1913
<b>Damrosch, Walter Johannes, Mus.D.</b> Musician, Conductor. 168 East 71st Street, New York 21, N. Y.	1939

	Date of Election
<b>Darrach, William, A.B., A.M., M.D., Sc.D., LL.D.</b> Professor of Clinical Surgery, Dean Emeritus of the Medical Faculty, Columbia University. 180 Fort Washington Avenue, New York 32, N. Y.	1929
<b>Darrow, Karl Kelchner, Ph.D.</b> Research Physicist, Bell Telephone Laboratories. 230 West 105th Street, New York 25, N. Y.	1936
<b>†Davenport, Charles Benedict, Ph.D.</b> Biologist. Cold Spring Harbor, Long Island, N. Y.	1907
<b>Davis, Bradley Moore, A.M., Ph.D.</b> Professor Emeritus of Botany, University of Michigan, Ann Arbor, Mich.	1914
<b>Davis, Harvey Nathaniel, A.B., A.M., Ph.D., Sc.D., LL.D., D.Eng.</b> Mechanical Engineer, President, Stevens Institute of Technology; Director, Office of Public Relations Division, War Production Board. Hoxie House, Castle Point, Hoboken, N. J.	1935
<b>Davis, John William, A.B., LL.B., LL.D.</b> Lawyer, United States Solicitor General (1913-18); United States Ambassador to Great Britain (1918-21). 15 Broad Street, New York 5, N. Y.	1923
<b>Davisson, Clinton J., Ph.D., D.Sc.</b> Physicist, Bell Telephone Laboratories, 463 West Street, New York 14, N. Y.	1929
<b>Day, Arthur L., Ph.D., Sc.D.</b> Geophysicist, Director (ret.), Geophysical Laboratory (1907-36), Carnegie Institution of Washington. 9113 Old Georgetown Road, Bethesda, Md.	1912
<b>Day, Edmund Ezra, Ph.D., LL.D.</b> President, Cornell University, Ithaca, N. Y.	1937
<b>Delano, Frederic Adrian</b> Administrator (ret.); Vice-chairman, National Resources Committee. 2400 16th Street, Washington, D. C.	1935

† Deceased February 17, 1944.

	Date of Election
<b>Dempster, Arthur Jeffrey, A.B., A.M., Ph.D., Sc.D.</b> Professor of Physics, University of Chicago. 5757 Kenwood Avenue, Chicago 37, Ill.	1932
<b>Derleth, Charles, Jr., C.E., LL.D.</b> Engineer, Chairman, Department of Civil Engineering, University of California, Berkeley 4, Calif.	1936
<b>Detwiler, Samuel Randall, Ph.D.</b> Professor of Anatomy, Columbia University, New York 27, N. Y.	1940
<b>Dewey, John, A.B., Ph.D., LL.D.</b> Professor Emeritus of Philosophy, Columbia University. 1 West 89th Street, New York 24, N. Y.	1911
<b>Dickinson, John, Ph.D., LL.B., LL.D.</b> Professor of Law, University of Pennsylvania; General Counsel, Pennsylvania Railroad Company. 1740 Broad Street Station Building, Philadelphia 4, Pa.	1940
<b>Dinsmoor, William Bell, Litt.D.</b> Professor of Archaeology, Columbia University. 9 East 77th Street, New York 21, N. Y.	1933
<b>Dobzhansky, Theodosius</b> Professor of Zoology, Columbia University, New York 27, N. Y.	1942
<b>Dodds, Harold Willis, Ph.D., LL.D.</b> Administrator, President, Princeton University, Princeton, N. J.	1935
<b>Doisy, Edward Adelbert, M.S., Ph.D.</b> Professor of Biochemistry, St. Louis University School of Medicine. 310 Glen Road, Webster Groves 19, Mo.	1942
<b>Douglas, Lewis Williams, B.A., LL.D.</b> President, Mutual Life Insurance Company of New York. 34 Nassau Street, New York 5, N. Y.	1942
<b>Douglass, Andrew Ellicott, D.Sc.</b> Professor of Astronomy and Dendrochronology, University of Arizona, Tucson, Ariz.	1941

	Date of Election
<b>Dresden, Arnold, M.S., Ph.D.</b> Professor of Mathematics, Swarthmore College. 606 Elm Avenue, Swarthmore, Pa.	1932
<b>Duane, Morris, A.B., LL.B.</b> Lawyer, Duane, Morris and Heckscher. At present Lieutenant Commander, United States Naval Reserve, Bureau of Aeronautics, Navy Department, Washington, D. C.	1940
<b>DuBois, Eugene Floyd, M.D.</b> Professor of Medicine, Cornell University Medical College; Physician-in-Chief, New York Hospital. 525 East 68th Street, New York 21, N. Y.	1940
<b>DuBridge, Lee Alvin, A.M., Ph.D., Sc.D.</b> Professor and Chairman, Department of Physics (on leave of absence), Dean of the Faculty of Arts and Sciences, University of Rochester. 64 Edgemoor Road, Belmont, Mass.	1942
<b>Duggar, Benjamin Minge, A.M., Ph.D.</b> Professor Emeritus of Plant Pathology and Botany, University of Wisconsin. Care Lederle Laboratories, Inc., Pearl River, N. Y.	1921
<b>Dunbar, Carl Owen, A.B., Ph.D.</b> Professor of Paleontology and Stratigraphy, Director, Peabody Museum, Yale University, New Haven 11, Conn.	1942
<b>Dunn, Gano, M.S., E.E., D.Sc.</b> Engineer, President, J. G. White Engineering Corporation; President, Cooper Union for the Advancement of Science and Art. 80 Broad Street, New York 4, N. Y.	1924
<b>Dunn, L(eslie) Clarence, B.S., M.S., Sc.D.</b> Professor of Zoology and Executive Officer, Department of Zoology, Columbia University, New York 27, N. Y.	1943
<b>Du Pont, Pierre Samuel, B.S.</b> Chemist, Manufacturer, E. I. du Pont de Nemours and Company. Du Pont Building, Wilmington, Del.	1917
<b>Durand, William Frederick, Ph.D., LL.D.</b> Professor Emeritus of Mechanical Engineering, Stanford University, Calif.	1917



	Date of Election
<b>Edgerton, Franklin, Ph.D.</b> Professor of Sanskrit and Comparative Philology, Yale University. 174 Blake Road, Hamden, New Haven 14, Conn.	1935
<b>Einstein, Albert, Ph.D., M.D.</b> Professor of Theoretical Physics, Institute for Advanced Study, Princeton, N. J.	1930
<b>Eisenhart, Luther Pfahler, A.B., Ph.D., Sc.D., LL.D.</b> Professor of Mathematics, Dean, Graduate School, Princeton University, Princeton, N. J.	1913
<b>Erlanger, Joseph, B.S., M.D., LL.D., Sc.D.</b> Professor of Physiology, Washington University. 4580 Scott Avenue, St. Louis 10, Mo.	1927
<b>Evans, Griffith Conrad, Ph.D.</b> Professor of Mathematics, University of California. 820 San Diego Road, Berkeley 7, Calif.	1941
<b>Eyring, Henry, Ph.D.</b> Professor of Chemistry, Princeton University, Princeton, N. J.	1941
<b>Farrand, Max, Ph.D., Litt.D., LL.D.</b> Historian, Research Associate, Huntington Library and Art Gallery. Reef Point, Bar Harbor, Maine.	1928
<b>Fels, Samuel S., LL.D.</b> President, Fels and Company, Paschall Oxygen Company. 39th and Walnut Streets, Philadelphia 4, Pa.	1939
<b>Ferguson, William Scott, A.M., Ph.D., LL.D., Litt.D.</b> MacLean Professor of Ancient and Modern History, Dean, Faculty of Arts and Sciences, Harvard University. 8 Scott Street, Cambridge 8, Mass.	1937
<b>Fermi, Enrico, Ph.D.</b> Professor of Physics, Columbia University, New York 27, N. Y.	1939
<b>Fernald, Merritt Lyndon, S.B., D.C.L., D.Sc.</b> Professor of Natural History, Director, Gray Herbarium, Harvard University, Cambridge 38, Mass.	1936

	Date of Election
Fetter, Frank Albert, Ph.D., LL.D. Professor Emeritus of Political Economy, Princeton University. 168 Prospect Avenue, Princeton, N. J.	1935
Fieser, Louis Frederick, Ph.D. Sheldon Emery Professor of Organic Chemistry, Harvard University. 27 Pinehurst Road, Belmont 38, Mass.	1941
Fisher, Irving, B.A., Ph.D., LL.D. Professor Emeritus of Economics, Yale University. Box 1825, New Haven 8, Conn.	1927
Flexner, Simon, M.D., Sc.D., LL.D. Pathologist, Director Emeritus, Rockefeller Institute for Medical Research, 66th Street and York Avenue, New York 21, N. Y.	1901
Foote, Paul Darwin, A.B., M.A., Ph.D. Physicist, Executive Vice-president, Gulf Research and Development Company. P.O. Drawer 2038, Pittsburgh, Pa.	1927
Forbes, Alexander, A.B., A.M., M.D. Professor of Physiology, Harvard Medical School, Shattuck Street, Boston, Mass.	1931
Ford, Guy Stanton, Ph.D., Litt.D., LL.D., L.H.D. Executive Secretary and Editor, <i>American Historical Review</i> . Study 274, Library of Congress Annex, Washington 25, D. C.	1939
Fosdick, Raymond Blaine, B.A., M.A., LL.B., LL.D. Lawyer, President, Rockefeller Foundation and General Education Board, 49 West 49th Street, New York 20, N. Y.	1930
Fox, Dixon Ryan, Ph.D., Pd.D., L.H.D., Litt.D., LL.D., D.C.L. Historian, President, Union College, Schenectady 8, N. Y.	1935
Franck, James, Ph.D., LL.D. Professor of Physical Chemistry, University of Chicago, Chicago 15, Ill.	1937
Frankfurter, Felix, LL.B. Associate Justice, Supreme Court of the United States, Washington, D. C.	1939

	Date of Election
Freeman, Douglas Southall, Ph.D., LL.D., D.Litt., Litt.D., L.H.D. Editor, <i>The Richmond News Leader</i> , Richmond 13, Va.	1943
Frost, Robert, L.H.D., Litt.D. Poet, Professor of English, Amherst College. South Shaftsbury, Vt.	1937
Gaposchkin, Cecilia Payne, B.A., Ph.D. Astronomer, Harvard College Observatory, Cambridge 38, Mass.	1936
Gasser, Herbert Spencer, A.M., M.D., Sc.D. Physiologist, Director, Rockefeller Institute for Medical Research, 66th Street and York Avenue, New York 21, N. Y.	1937
Gates, Thomas Sovereign, Ph.B., LL.B., LL.D. Administrator, President, University of Pennsylvania, Philadelphia 4, Pa.	1930
Gay, Edwin Francis, A.B., Ph.D., Litt.D., LL.D. Professor Emeritus of Economic History, Harvard University. 1650 Orlando Road, San Marino 5, Calif.	1932
Giauque, William Francis, Ph.D., Sc.D. Professor of Chemistry, University of California, Berkeley 4, Calif.	1940
Gies, William J., B.S., Ph.B., M.S., Ph.D., Sc.D., LL.D. Professor of Biological Chemistry, Columbia University Medical School. 630 West 168th Street, New York 32, N. Y.	1915
Gifford, Walter Sherman, A.B., LL.D., D.Sc., D.C.L. Administrator, President, American Telephone and Tele- graph Company. 195 Broadway, New York 7, N. Y.	1931
Gomberg, Moses, B.S., Sc.D., LL.D. Professor Emeritus of Chemistry, University of Michigan. 712 Onondaga Street, Ann Arbor, Mich.	1920
Goodpasture, Ernest William, M.D., Hon. D.Sc. Professor of Pathology, School of Medicine, Vanderbilt University, Nashville 4, Tenn.	1943

	Date of Election
<b>Goodrich, Herbert Funk, A.B., LL.B., LL.D.</b> Judge, United States Circuit Court of Appeals, Third Circuit. 7701 Cresheim Road, Chestnut Hill, Philadelphia 18, Pa.	1937
<b>Graham, Evarts Ambrose, M.D., Sc.D., LL.D., M.S.</b> Professor of Surgery, Washington University School of Medicine, St. Louis 10, Mo.	1941
<b>Graves, Frank Pierrepont, Ph.D., Litt.D., L.H.D., LL.D., J.U.D., D.C.L.</b> Educator, President, University of the State of New York; State Commissioner of Education, Emeritus. 58 South Swan Street, Albany, N. Y.	1927
<b>Greene, Evarts B., Ph.D., Litt.D., L.H.D., LL.D.</b> Professor Emeritus of American History, Columbia University. Box 285, Croton-on-Hudson, N. Y.	1931
<b>Gregory, Herbert Ernest, Ph.D., D.Sc.</b> Silliman Professor Emeritus of Geology, Yale University; Director Emeritus, Bernice P. Bishop Museum, Honolulu, Hawaii.	1923
<b>Gregory, William King, A.M., Ph.D., D.Sc.</b> Professor of Vertebrate Paleontology, Columbia University; Curator, Department of Comparative Anatomy, Department of Ichthyology, American Museum of Natural History, New York 24, N. Y.	1925
<b>Gulick, Charles Burton, Ph.D.</b> Eliot Professor Emeritus of Greek Literature, Harvard University. 59 Fayerweather Street, Cambridge 38, Mass.	1940
<b>Haney, John Louis, A.B., A.M., B.S., Ph.D., LL.D.</b> Educator, President (ret.), Central High School of Philadelphia. 6419 Woodbine Avenue, Overbrook, Philadelphia 31, Pa.	1929
<b>Harkins, William Draper, A.B., Ph.D.</b> Professor of Physical Chemistry, University of Chicago. 5437 Ellis Avenue, Chicago, Ill.	1925
<b>Harper, Robert A., M.A., Ph.D., D.Sc.</b> Professor Emeritus of Botany, Columbia University. Bedford, Va.	1909

	Date of Election
<b>Harrison, Ross G., M.A., Ph.D., M.D., Sc.D., LL.D.</b> Professor Emeritus of Biology, Yale University; Chairman, National Research Council. 142 Huntington Street, New Haven 11, Conn.	1913
<b>Harvey, E. Newton, Ph.D.</b> Henry Fairfield Osborn Professor of Biology, Princeton University, Princeton, N. J.	1929
<b>Hastings, A. Baird, Ph.D., Sc.D., B.S.</b> Hamilton Kuhn Professor of Biological Chemistry, Harvard Medical School, Boston 15, Mass.	1941
<b>Hawk, Philip Bovier, M.S., Ph.D.</b> Chemist, President and Director, Food Research Laboratories, Inc., of New York. 48-14 Thirty-Third Street, Long Island City, N. Y.	1915
<b>Hayes, Carlton Joseph Huntley, Ph.D., Litt.D., LL.D., L.H.D.</b> Seth Low Professor of History, Columbia University; United States Ambassador to Spain (1942-). 427 West 117th Street, New York 27, N. Y.	1940
<b>Hayward, Nathan, A.B., S.B.</b> President (ret.), The Franklin Institute. 12 South Twelfth Street, Philadelphia 7, Pa.	1937
<b>Heiser, Victor George, A.B., M.D., Sc.D., LL.D.</b> Physician (ret.). Bantam, Conn.	1918
<b>†Henderson, Yandell, Ph.D., M.D.(hon.)</b> Professor Emeritus of Physiology, Yale University. 440 Prospect Street, New Haven, Conn.	1935
<b>Hendrickson, George Lincoln, A.B., L.H.D.</b> Professor of Greek and Latin Literature, 851 Branford College, Yale University, New Haven 11, Conn.	1932
<b>Hisaw, Frederick Lee, Ph.D., LL.D.</b> Professor of Zoology, Harvard University, Cambridge 38, Mass.	1940
† Deceased February 18, 1944.	

	Date of Election
<b>Hobbs, William Herbert, A.M., Ph.D., D.Eng., LL.D.</b> Professor Emeritus of Geology, University of Michigan. 1705 Hill Street, Ann Arbor, Mich.	1909
<b>Hocking, William Ernest, Ph.D., L.H.D., D.D., Th.D., LL.D.</b> Professor Emeritus of Philosophy, Harvard University. P.O. Box, Madison, N. H.	1943
<b>Holland, Leicester Bodine, B.S., Ph.D.</b> Chief, Division of Fine Arts, Library of Congress. 415 West Price Street, Germantown, Philadelphia 44, Pa.	1931
<b>Hooton, Earnest A., B.A., M.A., Ph.D., B.Litt., Sc.D.</b> Professor of Anthropology, Curator of Somatology, Peabody Museum, Harvard University, Cambridge 38, Mass.	1931
<b>Hoover, Herbert, Dr. Eng., M.D., Sc.D., LL.D., D.C.L., J.D.</b> Engineer, Thirty-first President of the United States. Stanford University, Calif.	1918
<b>Hopkins, B Smith, Ph.D., D.Sc., LL.D.</b> Professor Emeritus of Inorganic Chemistry, University of Illinois, Urbana, Ill.	1927
<b>Hopkinson, Edward, Jr., A.B., LL.B.</b> Lawyer, Banker, Trustee, University of Pennsylvania. P.O. Box 7468, Philadelphia 1, Pa.	1938
<b>Howard, Leland Ossian, M.D., Ph.D., Sc.D., LL.D.</b> Zoologist, Consulting Entomologist, United States Public Health Service. Bureau of Entomology, United States Department of Agriculture, Washington, D. C.	1911
<b>Howell, William Henry, A.B., Ph.D., M.D., Sc.D., LL.D.</b> Professor Emeritus of Physiology, Formerly Dean, Medical Faculty and Director, School of Hygiene, Johns Hopkins University. 112 St. Dunstan's Road, Baltimore 12, Md.	1903
<b>Hubble, Edwin P., B.Sc., Ph.D., B.A., D.Sc., LL.D.</b> Astronomer, Mount Wilson Observatory, Pasadena 4, Calif.	1929

	Date of Election
<b>Hudson, Manley Ottmer, A.M., LL.B., S.J.D., LL.D. D.C.L.</b>	1941
Judge, Permanent Court of International Justice; Bemis Professor of International Law, Harvard University, Cambridge 38, Mass.	
<b>Huebner, Solomon Stephen, Ph.D., Sc.D., B.L., M.L.</b>	1930
Professor of Insurance and Commerce, University of Pennsylvania; President, American College of Life Un- derwriters. 697 South Highland Avenue, Merion, Pa.	
<b>Hughes, Charles Evans, A.B., A.M., LL.B., LL.D., D.C.L.</b>	1926
Chief Justice of the United States (ret.). 2223 R Street, N.W., Washington 8, D. C.	
<b>Hulett, George A., A.B., Ph.D.</b>	1913
Professor Emeritus of Physical Chemistry, Princeton University. 44 Washington Road, Princeton, N. J.	
<b>Humphreys, William Jackson, A.B., C.E., Ph.D.</b>	1929
Professor Emeritus of Meteorological Physics, George Washington University; Collaborator, United States Weather Bureau, Washington, D. C.	
<b>Hunsaker, Jerome Clarke, D.Sc.</b>	1940
Head, Department of Mechanical Engineering, Massachusetts Institute of Technology; Professor in Charge, Guggenheim Aeronautical Laboratory. 10 Louisburg Square, Boston, Mass.	
<b>Hunter, Walter Samuel, Ph.D.</b>	1941
Professor of Psychology, Director, Psychological Laboratory, Brown University. 61 Prospect Street, Providence, R. I.	
<b>Huntington, Edward Vermilye, A.B., A.M., Ph.D., Sc.D.</b>	1933
Mathematician, Professor Emeritus of Mechanics, Harvard University. 48 Highland Street, Cambridge 38, Mass.	
<b>Ives, Herbert E., B.S., Ph.D., Sc.D.</b>	1917
Physicist, Bell Telephone Laboratories. 32 Laurel Place, Montclair, N. J.	
<b>Jackson, Dugald Caleb, C.E., D.Sc., D.Eng.</b>	1931
Professor Emeritus of Electrical Engineering, Massachusetts Institute of Technology. 5 Mercer Circle, Cambridge 38, Mass.	

	Date of Election
<b>Jacobs, Merkel Henry, A.B., Ph.D.</b> Professor of General Physiology, University of Pennsylvania, Philadelphia 4, Pa.	1930
<b>Jayne, Horace Howard Furness, A.B., A.M.</b> Archaeologist, Vice-director, Metropolitan Museum of Art, New York 28, N. Y.	1934
<b>Jenks, John Story, M.A.</b> Banker. 1421 Chestnut Street, Philadelphia 2, Pa.	1936
<b>Jennings, Herbert S., Ph.D., Sc.D., LL.D.</b> Professor Emeritus of Zoology, Johns Hopkins University; Research Associate, University of California, Los Angeles, Calif.	1907
<b>Jessup, Philip C., LL.B., LL.D., Ph.D.</b> Professor of International Law, Columbia University, New York 27, N. Y.	1939
<b>Jewett, Frank Baldwin, A.B., Ph.D., D.Sc., D.Eng., LL.D.</b> Vice-president, American Telephone and Telegraph Company; Chairman of the Board, Bell Telephone Laboratories, Inc. 195 Broadway, New York 7, N. Y.	1938
<b>Johnson, Alvin Saunders, Ph.D.</b> Economist, Director and Chairman, Graduate Faculty of Political Science, New School for Social Research. Nyack, N. Y.	1942
<b>†Johnson, Douglas, B.S., Ph.D., D.Sc., LL.D.</b> Professor of Geology, Columbia University, New York 27, N. Y.	1920
<b>Johnson, Eldridge Reeves, A.E.D.</b> Industrialist, Founder, Victor Talking Machine Company. 608 West Jersey Trust Building, Camden, N. J.	1928
<b>Johnson, Emory R., Litt.M., Ph.D., Sc.D.</b> Professor Emeritus of Transportation and Commerce, Logan Hall, University of Pennsylvania, Philadelphia 4, Pa.	1915
<b>Jones, Howard Mumford, M.A., Litt.D., L.H.D.</b> Dean, Graduate School of Arts and Sciences, Harvard University, Cambridge 38, Mass.	1941

† Deceased February 25, 1944.



	Date of Election
<b>Jones, Lewis Ralph, Ph.B., Ph.D., Sc.D., LL.D.</b> Professor Emeritus of Plant Pathology, University of Wisconsin, Madison 6, Wis.	1925
<b>Joslin, Elliott Proctor, B.A., M.A., Ph.B., M.D.</b> Physician, Clinical Professor Emeritus of Medicine, Harvard Medical School. 81 Bay State Road, Boston 15, Mass.	1925
<b>Kármán, Theodor von, Ph.D., D.Eng., D.Sc.</b> Professor of Aeronautics, Director, Guggenheim Aeronautics Laboratory, California Institute of Technology. 1501 South Marengo Avenue, Pasadena, Calif.	1941
<b>Kelley, Nicholas, A.B., LL.B.</b> Lawyer, Member of the Firm, Larkin, Rathbone, and Perry; Vice-president, General Counsel and Director, Chrysler Corporation. 70 Broadway, New York 4, N. Y.	1942
<b>Kemmerer, Edwin Walter, A.B., Ph.D., LL.D., D.C.S., D.Sc.</b> Political Economist, Professor Emeritus of International Finance, Princeton University. 161 Hodge Road, Princeton, N. J.	1932
<b>Kettering, Charles Franklin, M.E., E.E., D.Eng., D.Sc.</b> Research Engineer, Vice-president, General Motors Corporation; General Director, Research Laboratories Division, General Motors Corporation. Ridgeleigh Terrace, Dayton, Ohio.	1930
<b>Keyes, Frederick George, M.S., Ph.D., D.Sc.</b> Professor and Head, Department of Chemistry, Massachusetts Institute of Technology. 15 Berkeley Street, Cambridge, Mass.	1938
<b>Kidder, Alfred Vincent, Ph.D., LL.D.</b> Archaeologist, Chairman, Division of Historical Research, Carnegie Institution of Washington. 10 Frisbie Place, Cambridge 38, Mass.	1934
<b>Kimball, Fiske, A.B., M.Arch., Ph.D., Dr. of Fine Arts.</b> Director, Philadelphia Museum of Art, Philadelphia 30, Pa.	1943

	Date of Election
<b>Kistiakowsky, George Bogdan, Ph.D.</b> Professor of Chemistry (on leave of absence), Harvard University. P.O. Box 5370, Los Angeles 55, Calif.	1940
<b>Kline, John Robert, A.B., A.M., Ph.D., Sc.D.</b> Professor of Mathematics, Chairman of the Department, University of Pennsylvania, Philadelphia 4, Pa.	1941
<b>Kofoid, Charles A., A.M., Ph.D., Sc.D., LL.D.</b> Professor Emeritus of Zoology, University of California, Berkeley 4, Calif.	1924
<b>Köhler, Wolfgang, Ph.D.</b> Professor of Psychology, Swarthmore College. 603 Elm Avenue, Swarthmore, Pa.	1939
<b>Kraus, Charles August, Ph.D.</b> Professor of Chemistry and Director of Research in Chemistry, Brown University. 92 Keene Street, Providence, R. I.	1939
<b>Kroeber, Alfred Louis, Ph.D.</b> Professor of Anthropology, Director, Anthropological Museum, University of California, Berkeley 4, Calif.	1941
<b>Kunkel, Louis Otto, Ph.D.</b> Botanist, Member, Rockefeller Institute for Medical Research, Princeton, N. J.	1942
<b>Lamb, Arthur Becket, Ph.D., D.Sc.</b> Professor of Chemistry, Dean, Graduate School of Arts and Sciences, Harvard University. 12 Oxford Street, Cambridge, Mass.	1936
<b>Lamont, Thomas William, A.B., LL.D.</b> Banker, Trustee. 23 Wall Street, New York 5, N. Y.	1932
<b>Lampland, Carl O., A.B., A.M., LL.D.</b> Astronomer, Lowell Observatory, Flagstaff, Ariz.	1931
<b>Lancaster, Henry Carrington, M.A., Ph.D.</b> Professor of French Literature, Chairman, Department of Romance Languages, Johns Hopkins University. 604 Edgevale Road, Baltimore 10, Md.	1938
<b>Landis, James McCauley, LL.B., S.J.D.</b> Director, United States Office of Civilian Defense; Dean, Harvard Law School. 7 Francis Street, Cambridge, Mass.	1942

	Date of Election
<b>Langmuir, Irving, M.A., Ph.D., Sc.D., LL.D.</b> Chemist and Physicist, Associate Director, Research Laboratory, General Electric Company, Schenectady, N. Y.	1922
<b>Lashley, Karl Spencer, M.S., Ph.D., Sc.D.</b> Research Professor of Neuropsychology, Harvard University. Yerkes Laboratories of Primate Biology, Orange Park, Fla.	1938
<b>Lattimore, Owen</b> Director, Walter Hines Page School of International Re- lations, Johns Hopkins University; Director, Pacific Operations, Office of War Information, 111 Sutter Street, San Francisco, Calif.	1943
<b>Lawrence, Ernest Orlando, B.S., A.M., Ph.D., Sc.D., LL.D.</b> Professor of Physics, Director, Radiation Laboratory, University of California, Berkeley 4, Calif.	1937
<b>Lawson, Andrew Cowper, M.A., Ph.D., Sc.D., LL.D.</b> Professor of Mineralogy and Geology (ret.), University of California, Berkeley 4, Calif.	1925
<b>Leeds, Morris Evans, D.Eng.</b> Chairman of the Board, Leeds and Northrup Company. 1025 Westview Street, Philadelphia 19, Pa.	1940
<b>Lefschetz, Solomon, M.E., Ph.D.</b> Research Professor of Mathematics, Princeton University. 129 Broadmead, Princeton, N. J.	1929
<b>Leith, Charles Kenneth, B.S., Ph.D., LL.D., D.Sc.</b> Professor of Geology, University of Wisconsin. Moraine, Old Sauk Road, Madison, Wis.	1926
<b>Leland, Waldo G., A.B., A.M., Litt.D., L.H.D.</b> Historian, Director, American Council of Learned Societies, 1219 Sixteenth Street, N.W., Washington 6, D. C.	1931
<b>Leuschner, Armin Otto, A.B., Ph.D., Sc.D., LL.D.</b> Professor of Astronomy, Director Emeritus, Students' Observatory, University of California. 1816 Scenic Avenue, Berkeley 4, Calif.	1924

	Date of Election
<b>Lewis, Clarence Irving, Ph.D.</b> Professor of Philosophy, Harvard University. 23 Oakland Street, Lexington 73, Mass.	1942
<b>Lewis, Gilbert Newton, A.B., A.M., Ph.D., D.Sc.</b> Professor of Chemistry, Dean, College of Chemistry, University of California, Berkeley 4, Calif.	1918
<b>Lewis, Warren Harmon, B.S., M.D.</b> Anatomist, Member, The Wistar Institute of Anatomy and Biology, Woodland Avenue and 36th Street, Philadelphia 4, Pa.	1943
<b>Lillie, Frank Ratray, B.A., Ph.D., Sc.D., LL.D.</b> Professor Emeritus of Embryology, University of Chicago. 5801 Kenwood Avenue, Chicago, Ill.	1916
<b>Lillie, Ralph Stayner, B.A., Ph.D., Sc.D.</b> Professor Emeritus of General Physiology, University of Chicago. 5545 Kenwood Avenue, Chicago 37, Ill.	1937
<b>Lind, Samuel Colville, A.B., S.B., Ph.D., D.Sc.</b> Physical Chemist, Dean, Institute of Technology, University of Minnesota, Minneapolis 14, Minn.	1943
<b>Lingelbach, William E., B.A., Ph.D., Litt.D.</b> Professor of Modern European History, University of Pennsylvania. 4304 Osage Avenue, Philadelphia 4, Pa.	1916
<b>Livingston, Burton E., B.S., Ph.D.</b> Professor of Plant Physiology and Forest Ecology, Director, Laboratory of Plant Physiology, Johns Hopkins University. Riderwood, Md.	1933
<b>Loeb, Leo, M.D.</b> Professor Emeritus of Pathology, Washington University. 40 Crestwood Drive, St. Louis 5, Mo.	1910
<b>Long, Esmond Ray, Ph.D., M.D.</b> Director, Henry Phipps Institute, Professor of Pathology, University of Pennsylvania; President, Wistar Institute. Henry Phipps Institute, Seventh and Lombard Streets, Philadelphia 47, Pa.	1940

	Date of Election
<b>Loomis, Alfred Lee, A.B., LL.B., D.Sc., M.Sc.</b> Physicist, Director, Loomis Laboratories. Tuxedo Park, N. Y.	1930
<b>Lovejoy, Arthur Oncken, A.B., A.M., LL.D.</b> Professor of Philosophy, Johns Hopkins University. 827 Park Avenue, Baltimore, Md.	1932
<b>Lovett, Edgar Odell, Ph.D., Sc.D., LL.D.</b> Mathematician and Astronomer, President, The Rice Institute, Houston 1, Texas.	1904
<b>Lowes, John Livingston, Ph.D., LL.D., Litt.D., L.H.D.</b> Francis Lee Higginson Professor Emeritus of English Literature, Harvard University. 984 Memorial Drive, Cambridge 38, Mass.	1934
<b>Lowie, Robert Harry, Ph.D., Sc.D.</b> Professor of Anthropology, University of California. 2521 Benvenue Avenue, Berkeley 4, Calif.	1942
<b>Lydenberg, Harry Miller, L.H.D., Litt.D.</b> Formerly Director, New York Public Library. Study 251, Library of Congress Annex, Washington 25, D. C.	1939
<b>Lyman, Theodore, A.M., Ph.D.</b> Professor Emeritus of Physics, Director, Jefferson Laboratory, Harvard University, Cambridge 38, Mass.	1918
<b>McClelland, George William, Ph.D., LL.D.</b> Professor of English, Provost, University of Pennsylvania. 4037 Pine Street, Philadelphia 3, Pa.	1941
<b>McClung, Clarence E., Ph.G., A.B., A.M., Ph.D., Sc.D.</b> Professor Emeritus of Zoology, University of Pennsylvania. 417 Harvard Avenue, Swarthmore, Pa.	1913
<b>McClure, Charles Freeman Williams, A.B., A.M., Sc.D.</b> Professor Emeritus of Comparative Anatomy, Princeton University. 1 Battle Road, Princeton, N. J.	1897
<b>MacCurdy, George Grant, A.B., A.M., Ph.D.</b> Professor Emeritus of Anthropology, Yale University; Director, American School of Prehistoric Research, Old Lyme, Conn.	1925

	Date of Election
<b>McDaniel, Walton Brooks, A.B., A.M., Ph.D.</b> Professor Emeritus of Latin Language and Literature, University of Pennsylvania. 4082 Malaga Avenue, Coconut Grove 33, Fla.	1917
<b>MacDougal, Daniel Trembly, M.A., Ph.D., LL.D.</b> Director (ret.), Laboratory for Plant Physiology, Carnegie Institution of Washington. Carmel, Calif.	1916
<b>McGregor, James Howard, B.S., M.A., Ph.D.</b> Professor of Zoology, Columbia University, New York 27, N. Y.	1929
<b>McIlwain, Charles Howard, A.M., Ph.D., LL.D.</b> Eaton Professor of the Science of Government, Harvard University. 48 Village Hill Road, Belmont, Mass.	1938
<b>MacInnes, Duncan Arthur, B.S., M.S., Ph.D.</b> Physical Chemist, Member, Rockefeller Institute for Medical Research, 66th Street and York Avenue, New York 21, N. Y.	1942
<b>MacIver, Robert Morrison, M.A., Ph.D., B.A., Litt.D.</b> Lieber Professor of Political Philosophy and Sociology, Columbia University. Palisades, N. Y.	1942
<b>McMath, Robert Reynolds, C.E., A.M., D.Sc.</b> Founder and Director, McMath-Hulbert Observatory, University of Michigan, Lake Angelus, R 4, Pontiac, Mich.	1942
<b>MacNider, William de Berniere, M.D., Sc.D., LL.D.</b> Kenan Research Professor of Pharmacology, University of North Carolina, Chapel Hill, N. C.	1939
<b>Mann, Thomas, D.Litt.</b> Author. 1550 San Remo Drive, Pacific Palisades, Calif.	1942
<b>Mark, Edward Laurens, A.M., Ph.D., LL.D.</b> Professor Emeritus of Anatomy, Harvard University. 109 Irving Street, Cambridge 38, Mass.	1907
<b>Mason, William Smith, Ph.B., A.M., L.H.D., D.Litt.</b> Man of Affairs, Collector of Frankliniana, University Trustee. 100 Los Altos Drive, Pasadena 2, Calif.	1928
<b>Mather, Frank Jewett, Jr., Ph.D., L.H.D.</b> Professor Emeritus of Art and Archaeology, Princeton University. Washington Crossing, Pa.	1940

Date of  
Election  
1899

- Matthews, Albert, A.B.**  
Modern Philologist and Historian.  
19 St. Botolph Street, Boston 16, Mass.
- Mees, Charles Edward Kenneth, D.Sc.** 1937  
Chemist, Vice-president in Charge of Research  
and Development, Eastman Kodak Company,  
Rochester 4, N. Y.
- Menzel, Donald Howard, A.B., A.M., Ph.D.** 1943  
Professor of Astrophysics, Harvard University.  
At present Lieutenant Commander, United States  
Naval Reserve, 3860 Rodman Street, N.W.,  
Washington 16, D. C.
- Meritt, Benjamin Dean, Ph.D., D.Litt., LL.D.** 1938  
Professor of Greek Epigraphy, Institute for Advanced  
Study, Princeton, N. J.
- Merriam, Charles Edward, Ph.D., LL.D.** 1935  
Professor of Political Science, University of Chicago.  
6041 University Avenue, Chicago 37, Ill.
- Merriam, John C., B.S., Ph.D., Sc.D., LL.D.** 1914  
Paleontologist, President Emeritus, Carnegie Institution  
of Washington. California Institute of Technology,  
Pasadena 4, Calif.
- Merrill, Elmer Drew, B.S., M.S., Sc.D., LL.D.** 1932  
Professor of Botany, Administrator of Botanical  
Collections, Harvard University. Arnold Arboretum,  
Jamaica Plain 30, Mass.
- Merrill, Paul Willard, Ph.D.** 1939  
Astronomer, Mount Wilson Observatory, Carnegie  
Institution of Washington, Pasadena 4, Calif.
- Metz, Charles William, Ph.D.** 1941  
Professor of Zoology, Director, Zoological Laboratory,  
University of Pennsylvania, Philadelphia 4, Pa.
- Miller, Gerrit Smith, Jr., A.B.** 1927  
Associate in Biology, United States  
National Museum, Washington 25, D. C.

	Date of Election
<b>Miller, Hunter, LL.B., LL.M., D.C.L.</b> International Law, Editor of <i>The Treaties</i> , Department of State. Craiglands, R. M. D. 1, Victoria, B. C., Canada.	1928
<b>Miller, John Anthony, A.M., Ph.D., LL.D.</b> Professor Emeritus of Astronomy, Director Emeritus, Sproul Observatory, Swarthmore College. Wallingford, Pa.	1915
<b>Millikan, Robert Andrews, Ph.D., LL.D., Sc.D.</b> Director, Norman Bridge Laboratory of Physics, Chairman, Executive Council, California Institute of Technology, Pasadena 4, Calif.	1914
<b>Minot, George Richards, A.B., M.D., S.D.</b> Professor of Medicine, Harvard University; Director, Thorndike Memorial Laboratory, and Visiting Physician, Boston City Hospital, Boston 18, Mass.	1935
<b>Mitchell, Samuel Alfred, Ph.D., LL.D.</b> Professor of Astronomy, Director, Leander McCormick Observatory, University of Virginia, University, Va.	1923
<b>Mitchell, Wesley Clair, A.B., Ph.D., LL.D., D.Litt.</b> Professor of Economics, Columbia University; Director of Research, National Bureau of Economic Research. 2 Horatio Street, New York 14, N. Y.	1931
<b>Moe, Henry Allen, B.A., B.C.L., M.A., B.S., L.H.D.</b> Lawyer, Secretary-General, Guggenheim Memorial Foundation, 551 Fifth Avenue, New York 17, N. Y.	1943
<b>Montgomery, James Alan, Ph.D., S.T.D., Litt.D., D.H.L.</b> Philologist, Formerly Director and President, American Schools of Oriental Research; Professor Emeritus of Hebrew, Graduate School, University of Pennsylvania. 6806 Greene Street, Germantown, Philadelphia 19, Pa.	1925
<b>Moore, George Thomas, A.M., Ph.D.</b> Botanist, Director, Missouri Botanical Garden, St. Louis 10, Mo.	1905
<b>Moore, J. Percy, Ph.D.</b> Professor Emeritus of Zoology, University of Pennsylvania, Philadelphia 4, Pa.	1918



	Date of Election
<b>Moore, John Bassett, LL.D.</b> International Law, Diplomatist, Member, Permanent Court of Arbitration (1912-28); Judge, Permanent Court of International Justice (1921-28). 960 Park Avenue, New York 28, N. Y.	1907
<b>Morey, Charles Rufus, A.M., L.H.D. Litt.D.</b> Marquand Professor of Art and Archaeology, Princeton University, Princeton, N. J.	1938
<b>Morgan, Marshall S., A.B.</b> President, Fidelity-Philadelphia Trust Company, 135 South Broad Street, Philadelphia 9, Pa.	1933
<b>Morgan, Thomas Hunt, B.S., Ph.D., D.Sc., LL.D.</b> Zoologist, Director, Kerckhoff Laboratories of Biological Sciences, California Institute of Technology, Pasadena 4, Calif.	1915
<b>Morison, Samuel Eliot, Ph.D., M.A., Litt.D.</b> Professor of History, Harvard University. 2561 Washington Street, Canton, Mass.	1937
<b>Morley, Sylvanus Griswold, Ph.D.</b> In Charge, Carnegie Institution of Washington Archaeological Expeditions to Central America; Director, Chichen Itza Project. Apartado Postal 385, Merida, Yucatan, Mexico.	1940
<b>Morris, Harrison Smith</b> Author, Formerly Managing Director, Pennsylvania Academy of the Fine Arts. 1600 Cheltenham Avenue, Philadelphia 26, Pa.	1899
<b>Morris, Lawrence J., A.B.</b> Man of Affairs, Secretary, Pennsylvania Hospital. 240 South 4th Street, Philadelphia 6, Pa.	1936
<b>Morris, Roland S., A.B., LL.B., LL.D., D.C.L., L.H.D.</b> Lawyer, Diplomatist, Professor of International Law, University of Pennsylvania; United States Ambassador to Japan (1917-21). 1617 Land Title Building, Philadelphia 10, Pa.	1922
<b>Morse, Marston, Ph.D., Sc.D.</b> Professor of Mathematics, Institute for Advanced Study, Princeton, N. J.	1936

	Date of Election
<b>Moulton, Forest Ray, A.B., Ph.D., Sc.D., LL.D.</b> Mathematician, Astronomer, Permanent Secretary, American Association for the Advancement of Science, Smithsonian Institution Building, Washington 25, D. C.	1916
<b>Moulton, Harold Glenn, Ph.D., LL.D.</b> Economist, President, The Brookings Institution, 722 Jackson Place, N.W., Washington 6, D. C.	1938
<b>Mulliken, Robert Sanderson, B.S., Ph.D., Sc.D.</b> Professor of Physics, University of Chicago, Chicago 15, Ill.	1940
<b>Mumford, Lewis</b> Author. Amenia, N. Y.	1941
<b>Murlin, John Raymond, B.S., A.M., Ph.D., Sc.D.</b> Professor of Physiology, Director, Department of Vital Economics, University of Rochester, 260 Crittenden Boulevard, Rochester 7, N. Y.	1932
<b>Murnaghan, Francis Dominic, M.A., Ph.D.</b> Professor of Applied Mathematics, Chairman of the Department of Mathematics, Johns Hopkins University. 6202 Sycamore Road, Baltimore 12, Md.	1942
<b>von Neumann, John, Ph.D., C.E.</b> Professor of Mathematics, Institute for Advanced Study. 26 Westcott Road, Princeton, N. J.	1938
<b>Nicolson, Marjorie Hope, Ph.D., Litt.D., L.H.D., LL.D.</b> Professor of English, Columbia University, New York 27, N. Y.	1941
<b>Nitze, William Albert, Ph.D., L.H.D.</b> Professor of French, University of California at Los Angeles. 411 Lomond Avenue, Los Angeles 24, Calif.	1936
<b>Nock, Arthur Darby, LL.D.</b> Frothingham Professor of the History of Religion, Harvard University. K21 Eliot House, Cambridge 38, Mass.	1941
<b>Norris, George William, B.A., M.D.</b> Physician, Author, Chief, Medical Service "A," Pennsylvania Hospital. Dimock, Susquehanna County, Pa.	1922

	Date of Election
<b>Northrop, John Howard, M.A., Ph.D., D.Sc., LL.D.</b> Biochemist, Rockefeller Institute for Medical Research, Princeton, N. J.	1938
<b>Novy, Frederick G., Sc.D., M.D., LL.D.</b> Dean Emeritus, Medical School, Professor Emeritus of Bacteriology, University of Michigan, Ann Arbor, Mich.	1934
<b>Ogburn, William Fielding, Ph.D., LL.D.</b> Sewell L. Avery Distinguished Service Professor of Sociology, University of Chicago. 5525 Woodlawn Avenue, Chicago 37, Ill.	1940
<b>Olivier, Charles P., M.A., Ph.D.</b> Professor of Astronomy, Director, Flower Observatory, University of Pennsylvania, Upper Darby, Pa.	1932
<b>O'Neill, Eugene Gladstone, Litt.D.</b> Author, Playwright. Danville, Contra Costa County, Calif.	1935
<b>Osgood, Charles Grosvenor, B.A., Ph.D.</b> Professor Emeritus of English, Princeton University. 92 Stockton Street, Princeton, N. J.	1943
<b>Osterhout, Winthrop John Vanleuven, A.M., Ph.D., Sc.D.</b> Physiologist, Rockefeller Institute for Medical Research, 66th Street and York Avenue, New York 21, N. Y.	1917
<b>Packard, Francis Randolph, M.D., LL.D.</b> Physician, Author. 304 South 19th Street, Philadelphia 3, Pa.	1933
<b>Painter, Theophilus Shickel, Ph.D., Sc.D.</b> Professor of Zoology, University of Texas. 610 West 33rd Street, Austin, Texas.	1939
<b>Panofsky, Erwin, Ph.D.</b> Professor of History of Art, Institute for Advanced Study. 97 Battle Road, Princeton, N. J.	1943
<b>Parker, George Howard, Sc.D.</b> Professor Emeritus of Zoology, Harvard University. 16 Berkeley Street, Cambridge 38, Mass.	1911
<b>Patterson, Ernest Minor, A.B., A.M., Ph.D., LL.D.</b> Professor of Economics, University of Pennsylvania. 404 South 47th Street, Philadelphia 43, Pa.	1932

	Date of Election
<b>Patterson, Lamar Gray</b> Chemist. Perdido Beach, Ala.	1898
<b>Pauling, Linus Carl, Ph.D., Sc.D.</b> Professor of Chemistry, Chairman, Division of Chemistry and Chemical Engineering, Director, Gates and Crellin Laboratories of Chemistry, California Institute of Technology, Pasadena 4, Calif.	1936
<b>Pender, Harold, A.B., Ph.D., Sc.D.</b> Dean, Moore School of Electrical Engineering, University of Pennsylvania; Consulting Engineer. 200 South 33rd Street, Philadelphia 4, Pa.	1917
<b>Pepper, George Wharton, B.A., LL.B., LL.D., D.C.L.</b> Lawyer, United States Senator (1922-27); Formerly Professor of Law, University of Pennsylvania. 2231 Land Title Building, Philadelphia 10, Pa.	1897
<b>Pepper, William, A.B., M.D., Sc.D., LL.D.</b> Dean, School of Medicine, University of Pennsylvania. Prospect Avenue, Melrose Park, Philadelphia 26, Pa.	1937
<b>Perry, Ralph Barton, Ph.D., Litt.D., L.H.D., LL.D.</b> Professor of Philosophy, Harvard University. 445 Widener Library, Cambridge 38, Mass.	1939
<b>Pound, Roscoe, Ph.D., LL.D., J.U.D., L.H.D.</b> University Professor at Harvard. 304 School Street, Watertown 72, Mass.	1940
<b>Prince, John Dyneley, B.A., Ph.D.</b> Orientalist and Comparative Philologist, Professor Emeritus of East European Languages, Philosophy Hall, Columbia University, New York 27, N. Y.	1913
<b>Putnam, Herbert, Litt.D., LL.D.</b> Librarian Emeritus of Congress, Washington, D. C.	1937
<b>Quinn, Arthur Hobson, Ph.D., Litt.D.</b> John Welsh Centennial Professor of History and English Literature, University of Pennsylvania. 401 Pembroke Road, Bala-Cynwyd, Pa.	1940

	Date of Election
Rabi, Isidor Isaac, B.Chem., Ph.D. Professor of Physics, Columbia University, New York 27, N. Y.	1941
Rand, Edward Kennard, A.B., A.M., Ph.D., Litt.D., LL.D. Pope Professor Emeritus of Latin, Harvard University. 107 Lake View Avenue, Cambridge, Mass.	1925
Ravenel, Mazÿck P., M.D. Physician, Editor-in-Chief, <i>American Journal of Public Health</i> . University of Missouri, Columbia, Mo.	1901
Read, Conyers, A.M., Ph.D., B.Litt., Litt.D. Professor of English History (on leave of absence), University of Pennsylvania. 3207 P Street, N.W., Washington 7, D. C.	1934
Reid, Harry Fielding, C.E., A.B., Ph.D. Professor Emeritus of Dynamical Geology and Geography, Johns Hopkins University, Baltimore 18, Md.	1910
Repplier, Agnes, Litt.D. Author. 920 Clinton Street, Philadelphia 7, Pa.	1928
Rhoads, Charles James, A.B. Banker (ret.), Trustee, Bryn Mawr College, Haverford College. Bryn Mawr, Pa.	1921
Richards, Alfred Newton, Ph.D., Sc.D., M.D., LL.D. Professor of Pharmacology, University of Pennsylvania. 6 Rugby Road, Bryn Mawr, Pa.	1935
Richards, Horace Clark, A.B., Ph.D. Professor Emeritus of Mathematical Physics, University of Pennsylvania. 509 Woodland Terrace, Philadelphia 4, Pa.	1907
Richter, Gisela Marie Augusta, Litt.D., M.A., L.H.D., D.F.A. Archaeologist, Curator, Greek and Roman Department, Metropolitan Museum of Art. 1170 Fifth Avenue, New York 29, N. Y.	1942
Riddle, Oscar, A.B., Ph.D., LL.D. Physiologist, Carnegie Institution, Station for Experimental Evolution, Cold Spring Harbor, Long Island, N. Y.	1926

	Date of Election
<b>Rivers, Thomas Milton, M.D., Sc.D.</b> Physician, Director, Hospital of the Rockefeller Institute for Medical Research. 163 Greenway South, Forest Hills, L. I., N. Y.	1942
<b>Robbins, William Jacob, Ph.D., Sc.D.</b> Professor of Botany, Columbia University; Director, New York Botanical Garden, Bronx Park, New York 58, N. Y.	1941
<b>Roberts, Owen J., A.B., LL.B., LL.D., D.C.L.</b> Associate Justice, Supreme Court of the United States, Washington, D. C.	1934
<b>Robertson, Howard Percy, Ph.D.</b> Professor of Mathematical Physics, Princeton University, Office of Scientific Research Division, United States Embassy, London. 175 Prospect Avenue, Princeton, N. J.	1940
<b>Robinson, David Moore, Ph.D., LL.D., L.H.D., Litt.D.</b> Professor of Archaeology and Epigraphy, Lecturer in Greek Literature, Johns Hopkins University, Baltimore 18, Md.	1936
<b>Rockefeller, John D., Jr., A.B., A.M.</b> Administrator, Trustee, Rockefeller Institute for Medical Research. 30 Rockefeller Plaza, New York 20, N. Y.	1931
<b>Rogers, Lindsay, Ph.D., LL.B.</b> Burgess Professor of Public Law, Columbia University. 175 Riverside Drive, New York 24, N. Y.	1941
<b>Rosenbach, A. S. W., B.S., Ph.D., D.F.A.</b> Author, Bibliographer, President, Gratz College. 1618 Locust Street, Philadelphia 3, Pa.	1928
<b>Rosengarten, Adolph G., B.S.</b> Man of Affairs, Trustee, University of Pennsylvania, Lankenau Hospital. St. Davids, Pa.	1940
<b>Rostovtzeff, Michael I., Ph.D., LL.D.</b> Director of Archaeological Research, Yale University. 470 Whitney Avenue, New Haven 11, Conn.	1929
<b>Rous, Peyton, M.D., D.Sc.</b> Member, Rockefeller Institute for Medical Research. 122 East 82nd Street, New York 28, N. Y.	1939

	Date of Election
Rowe, Leo S., A.B., LL.B., Ph.D., LL.D. Director General, Pan-American Union, Washington 6, D. C.	1911
Russell, Henry Norris, A.M., Ph.D., D.Sc. Professor of Astronomy, Director, Princeton University Observatory. 79 Alexander Street, Princeton, N. J.	1913
Ruthven, Alexander G., B.S., Ph.D., LL.D., Sc.D. Zoologist, President, University of Michigan, Ann Arbor, Mich.	1931
Sanders, Henry A., A.B., A.M., Ph.D., L.H.D. Professor Emeritus of Latin, University of Michigan. 2037 Geddes Avenue, Ann Arbor, Mich.	1932
Sarton, George, Sc.D., L.H.D., LL.D. Historian of Science, Professor, Harvard University; also Associate, Carnegie Institution of Washington. Harvard Library 185, Cambridge 38, Mass.	1934
Scattergood, J. Henry, A.B. Man of Affairs, Treasurer, Haverford College, Bryn Mawr College. Villa Nova, Pa.	1931
Schaeffer, J. Parsons, A.M., M.D., Ph.D., Sc.D. Professor of General Anatomy, Director, Daniel Baugh Institute of Anatomy, Jefferson Medical College. 4634 Spruce Street, Philadelphia 39, Pa.	1927
Schelling, Felix E., Ph.D., Litt.D., LL.D. Professor Emeritus of English Literature, University of Pennsylvania. 251 Claremont Avenue, Mount Vernon, N. Y.	1902
Schlesinger, Arthur Meier, Ph.D., Litt.D., L.H.D. Francis Lee Higginson Professor of History, Harvard University. 19 Gray Gardens East, Cambridge 38, Mass.	1941
Schmitt, Bernadotte Everly, M.A. (Oxon.), Ph.D., LL.D., Litt.D. Andrew MacLeish Distinguished Service Professor of Modern History, University of Chicago; Editor, <i>Jour- nal of Modern History</i> . 1126 East 59th Street, Chicago 37, Ill.	1942

	Date of Election
<b>Schramm, Jacob Richard, A.B., Ph.D.</b> Professor of Botany, Director, Department of Botany, Director, Morris Arboretum, University of Pennsylvania, Philadelphia 4, Pa.	1932
<b>Schultz, Adolph H., Ph.D.</b> Associate Professor of Physical Anthropology, School of Medicine, Johns Hopkins University, Baltimore 5, Md.	1936
<b>Schuyler, Robert Livingston, Ph.D., L.H.D.</b> Gouverneur Morris Professor of History, Columbia University. 1170 Fifth Avenue, New York 29, N. Y.	1942
<b>Scott, John Morin, A.B.</b> Lawyer. 1903 Spruce Street, Philadelphia 3, Pa.	1926
<b>Scott, William Berryman, M.A., Ph.D., Sc.D., LL.D.</b> Blair Professor Emeritus of Geology, Princeton University. 7 Cleveland Lane, Princeton, N. J.	1886
<b>Seares, Frederick Hanley, B.S., LL.D.</b> Astronomer, Research Associate, Carnegie Institution of Washington. Mount Wilson Observatory, Pasadena 4, Calif.	1917
<b>See, Thomas Jefferson Jackson, A.M., Lt.M., Sc.M., Ph.D., D.Sc.</b> Physicist, Astronomer, Geometer, Professor of Mathematics, United States Navy (ret.). 614 Ohio Street, Vallejo, Calif.	1897
<b>Seymour, Charles, Ph.D., Litt.D., LL.D., L.H.D.</b> President, Yale University. 43 Hillhouse Avenue, New Haven, Conn.	1939
<b>Shapley, Harlow, A.M., Ph.D., LL.D., Sc.D., D.Hon.Caus., Litt.D.</b> Astronomer, Director, Harvard College Observatory, Cambridge 38, Mass.	1922
<b>Shear, Theodore Leslie, Ph.D., L.H.D.</b> Professor of Classical Archaeology, Princeton University, Princeton, N. J.	1939



	Date of Election
<b>Shotwell, James Thomson, Ph.D., LL.D.</b> Professor of History, Columbia University; Trustee and Director, Division of Economics and History, Carnegie Endowment for International Peace. 405 West 117th Street, New York 27, N. Y.	1936
<b>Shull, George Harrison, B.S., Ph.D., Sc.D., LL.D.</b> Professor of Botany and Genetics, Princeton University. 60 Jefferson Road, Princeton, N. J.	1918
<b>Simpson, George Gaylord, Ph.D.</b> Curator of Fossil Mammals, American Museum of Natural History, New York 24, N. Y.	1936
<b>Singer, Edgar Arthur, Jr., B.S., Ph.D.</b> Professor of Philosophy, University of Pennsylvania. 4224 Chester Avenue, Philadelphia 4, Pa.	1925
<b>Sinnott, Edmund Ware, Ph.D.</b> Sterling Professor of Botany, Yale University, New Haven 11, Conn.	1939
<b>Sioussat, St. George Leakin, Ph.D.</b> Chief, Division of Manuscripts, Incumbent, Chair of American History, Library of Congress. 6309 Connecticut Avenue, Chevy Chase 15, Md.	1928
<b>Slater, John Clarke, Ph.D.</b> Professor of Physics, Massachusetts Institute of Technology, Cambridge 39, Mass.	1940
<b>Slipher, Vesto Melvin, A.M., Ph.D., LL.D., Sc.D.</b> Astronomer, Director, Lowell Observatory, Flagstaff, Ariz.	1921
<b>Smyth, Charles Phelps, Ph.D.</b> Professor of Chemistry, Princeton University. 22 Morven Street, Princeton, N. J.	1932
<b>Speiser, Ephraim Avigdor, M.A., Ph.D.</b> Professor of Semitics, University of Pennsylvania. 7601 West Avenue, Elkins Park, Philadelphia 17, Pa.	1941
<b>Spoeher, Herman Augustus, Ph.D., Sc.D.</b> Chairman, Division of Plant Biology, Carnegie Institution of Washington, Stanford University, Calif.	1931

	Date of Election
<b>Sprague, Oliver Mitchell Wentworth, A.M., Ph.D., Litt.D.</b> Edmund Cogswell Converse Professor of Banking and Finance, Harvard Graduate School of Business, Soldier's Field, Boston, Mass.	1938
<b>Stadler, Lewis John, Ph.D.</b> Professor of Field Crops, University of Missouri; Principal Geneticist, Bureau of Plant Industry, United States Department of Agriculture. 308 Thilly Avenue, Columbia, Mo.	1941
<b>Stakman, Elvin Charles, Ph.D., Dr.Nat.Science</b> Professor and Chief, Division of Plant Pathology and Botany, University of Minnesota Experiment Station; Agent, United States Department of Agriculture. University Farm, St. Paul 8, Minn.	1940
<b>Stanley, Wendell Meredith, Ph.D., Sc.D.</b> Biochemist, Member, Rockefeller Institute for Medical Research, Princeton, N. J.	1940
<b>Stebbins, Joel, Ph.D., Sc.D., LL.D.</b> Professor of Astronomy, Director, Washburn Observatory, University of Wisconsin, Madison 6, Wis.	1925
<b>Stefansson, Vilhjalmur, Ph.D., LL.D.</b> Arctic Explorer, Geographer and Adviser on Northern Operations to Pan-American Airways. 67 Morton Street, New York 14, N. Y.	1923
<b>Stewart, Walter W., A.B., LL.D.</b> Economist, Professor, School of Economics and Politics, Institute for Advanced Study, Princeton, N. J.	1943
<b>Stone, Harlan Fiske, LL.B., LL.D.</b> Chief Justice, Supreme Court of the United States. 2340 Wyoming Avenue, Washington 8, D. C.	1939
<b>Stone, Marshall Harvey, A.M., Ph.D., Sc.D., D.Hon.Caus.</b> Professor of Mathematics, Harvard University. 30 Hillside Avenue, Cambridge 40, Mass.	1943
<b>Streeter, George L., A.B., A.M., M.D., D.Sc., LL.D.</b> Research Associate, Carnegie Institution of Washington. Johns Hopkins Medical School, Baltimore 5, Md.	1943

	Date of Election
<b>Struve, Otto, Ph.D., Sc.D.</b> Professor of Astrophysics, University of Chicago; Director, Yerkes Observatory, Williams Bay, Wis.	1937
<b>Sturtevant, Alfred Henry, Ph.D.</b> Professor of Genetics, California Institute of Technology, Pasadena 4, Calif.	1936
<b>Sturtevant, Edgar Howard, Ph.D., L.H.D., LL.D.</b> Professor Emeritus of Linguistics, Yale University. 408 Whitney Avenue, New Haven, Conn.	1939
<b>Sumner, Francis Bertody, Ph.D.</b> Professor of Biology, Scripps Institution of Oceanography, University of California, La Jolla, Calif.	1938
<b>Swann, William Francis Gray, M.A., D.Sc.</b> Physicist, Director, Bartol Research Foundation, Whittier Place, Swarthmore, Pa.	1926
<b>Swindler, Mary Hamilton, A.B., A.M., LL.D., Ph.D.</b> Professor of Classical Archaeology, Bryn Mawr College. Low Buildings, Bryn Mawr, Pa.	1943
<b>Taliaferro, William Hay, Ph.D.</b> Eliakim H. Moore Distinguished Service Professor of Parasitology, Chairman, Department of Bacteriology and Parasitology, Dean, Division of Biological Sciences, University of Chicago. 5724 Ellis Avenue, Chicago 37, Ill.	1941
<b>Tate, John Torrence, Ph.D., D.Sc.</b> Professor of Physics, Dean, College of Science, Literature and the Arts, University of Minnesota. 1943 East River Road, Minneapolis, Minn.	1941
<b>Tatlock, J. S. P., Ph.D., Litt.D., LL.D.</b> Professor of English, University of California. 1560 Euclid Avenue, Berkeley 8, Calif.	1937
<b>Taylor, Deems, A.B., Mus.D., Litt.D.</b> Musician, Composer, Writer. The Haviland Road, Stamford, Conn.	1934

	Date of Election
<b>Taylor, Hugh Stott, D.Sc., LL.D.</b> David B. Jones Professor of Chemistry, Princeton University, Princeton, N. J.	1928
<b>Thorndike, Edward L., A.B., A.M., Ph.D., Sc.D., LL.D.</b> Professor Emeritus of Educational Psychology, Teachers College, Columbia University, New York 27, N. Y.	1932
<b>Thorndike, Lynn, Ph.D., L.H.D.</b> Professor of History, Columbia University, New York 27, N. Y.	1939
<b>Timoshenko, Stephen P., D.Sc.</b> Professor of Theoretical and Applied Mechanics, Stanford University. 536 West Crescent Drive, Palo Alto, Calif.	1939
<b>Tolman, Richard Chace, Ph.D.</b> Professor of Physical Chemistry and Mathematical Physics, California Institute of Technology, Pasadena 4, Calif.	1932
<b>Tozzer, Alfred Marston, A.B., A.M., Ph.D.</b> Professor of Anthropology, Harvard University. 7 Bryant Street, Cambridge 38, Mass.	1937
<b>Trelease, William, Sc.D., LL.D.</b> Professor Emeritus of Botany, University of Illinois, Urbana, Ill.	1903
<b>Tucker, Richard Hawley, C.E., Sc.D.</b> Astronomer, Formerly of Lick Observatory. 1525 Waverly Street, Palo Alto, Calif.	1908
<b>Tuve, Merle Antony, B.S., A.M., Ph.D.</b> Chief Physicist, Department of Terrestrial Magnetism, Carnegie Institution of Washington; Chairman, Section T, Office of Scientific Research and Development, Office for Emergency Management, 5241 Broad Branch Road, Washington, D. C.	1943
<b>Tyzzer, Ernest Edward, Ph.B., A.M., M.D., Sc.D.</b> Professor of Comparative Pathology and Tropical Medicine, Harvard Medical School. 175 Water Street, Wakefield, Mass.	1931

	Date of Election
<b>Urey, Harold Clayton, Ph.D., D.Sc., N.L.</b> Professor of Chemistry, Executive Officer of the Department, Columbia University. 355 Highwood Avenue, Leonia, N. J.	1935
<b>Vaillant, George Clapp, Ph.D.</b> Archaeologist, Director, University Museum, University of Pennsylvania; Senior Cultural Relations Officer, American Embassy, Lima, Peru.	1943
<b>Van Doren, Carl</b> Author and Historian. 41 Central Park West, New York 23, N. Y.	1942
<b>Van Vleck, John Hasbrouck, Ph.D.</b> Professor of Mathematical Physics, Harvard University, Cambridge 38, Mass.	1939
<b>Van Slyke, Donald Dexter, Ph.D., Sc.D., M.D.</b> Biochemist, Rockefeller Institute for Medical Research, 66th Street and York Avenue, New York 21, N. Y.	1938
<b>Vaughan, Thomas Wayland, B.Sci., A.M., Ph.D., LL.D.</b> Director Emeritus, Scripps Institution of Oceanography; Principal Scientist (ret.), United States Geological Survey; Associate in Paleontology, United States National Museum. 3333 P Street, Washington 7, D. C.	1923
<b>Veblen, Oswald, A.B., Ph.D., D.Sc.</b> Professor of Mathematics, Institute for Advanced Study. 58 Battle Road, Princeton, N. J.	1912
<b>Viner, Jacob, Ph.D.</b> Professor of Economics, University of Chicago. 5554 Kenwood Avenue, Chicago, Ill.	1942
<b>Wallace, Henry Agard, B.S., Hon. M.S.</b> Vice President of the United States, Washington, D. C.	1943
<b>Warren, Charles, A.B., A.M., LL.D.</b> Lawyer. 1527 Eighteenth Street, Washington 6, D. C.	1939
<b>Warren, Charles Hyde, Ph.B., Ph.D.</b> Dean, Sheffield Scientific School, Professor of Geology, Yale University. 100 High Street, New Haven 11, Conn.	1928

	Date of Election
<b>Webster, David Locke, A.B., Ph.D.</b> Professor and Executive Head, Department of Physics, Stanford University, Calif.	1922
<b>Weed, Lewis Hill, M.D., ScD., LL.D.</b> Professor of Anatomy, Director, School of Medicine, Johns Hopkins University. 3908 North Charles Street, Baltimore 18, Md.	1942
<b>Wertenbaker, Thomas Jefferson, B.A., M.A., Ph.D., L.H.D., Litt.D.</b> Edwards Professor of American History, Princeton University. 164 Prospect Avenue, Princeton, N. J.	1941
<b>Westergaard, Harald Malcolm, B.S., Ph.D., Dr.Ing., Dr.Tech., Sc.D.</b> Gordon McKay Professor of Civil Engineering, Dean, Graduate School of Engineering, Harvard University, Pierce Hall, Cambridge 38, Mass.	1942
<b>Wetherill, Samuel Price, B.S., LL.D.</b> Engineer. 1203 Morris Building, Philadelphia 2, Pa.	1933
<b>Wetmore, Alexander, A.B., M.S., Ph.D., D.Sc.</b> Zoologist, Assistant Secretary, Smithsonian Institution; Director, United States National Museum, Washington 25, D. C.	1930
<b>Weyl, Hermann, Ph.D., D.Eng., D.Sc.</b> Professor of Mathematics, Institute for Advanced Study, Princeton, N. J.	1935
<b>Whipple, George Hoyt, M.D., M.A., D.Sc., LL.D.</b> Professor of Pathology, Dean, School of Medicine and Dentistry, University of Rochester. 320 Westminister Road, Rochester 7, N. Y.	1938
<b>Whitmore, Frank Clifford, A.B., A.M., Ph.D., Sc.D.</b> Dean, School of Chemistry and Physics, Pennsylvania State College, State College, Pa.	1943
<b>Whitney, Willis R., S.B., Ph.D., Sc.D., Ch.D., LL.D.</b> Chemist, Honorary Vice-president, General Electric Company, Research Laboratory, Scheneectady 5, N. Y.	1931

	Date of Election
<b>Williams, John Henry, Ph.D., Sc.D.</b> Nathaniel Ropes Professor of Political Economy, Dean, Graduate School of Public Administration, Harvard University; Vice-president, Federal Reserve Bank of New York. 148 Coolidge Hill, Cambridge 38, Mass.	1942
<b>Williams, Robert R., M.S., D.Sc.</b> Chemical Director, Bell Telephone Laboratories. 297 Summit Avenue, Summit, N. J.	1942
<b>Willis, Bailey, E.M., C.E., Ph.D.</b> Professor Emeritus of Geology, Stanford University. Box 1365, Stanford University, Calif.	1905
<b>Willits, Joseph Henry, A.M., Ph.D., LL.D.</b> Director for the Social Sciences, Rockefeller Foundation, 49 West 49th Street, New York 20, N. Y.	1938
<b>Wilson, Edwin Bidwell, A.B., Ph.D.</b> Professor of Vital Statistics, Harvard School of Public Health. 55 Shattuck Street, Boston 15, Mass.	1917
<b>Wilson, George Grafton, Ph.D., LL.D.</b> Professor Emeritus of International Law, Langdell Hall, Harvard University, Cambridge 38, Mass.	1936
<b>Wilson, Harold Albert, M.A., M.Sc., D.Sc.</b> Professor of Physics, The Rice Institute, Houston, Texas	1914
<b>Winlock, Herbert Eustis, Art.D., Litt.D.</b> Director Emeritus and Formerly Curator, Egyptian Department, Metropolitan Museum of Art. 1010 Fifth Avenue, New York 28, N. Y.	1939
<b>Wissler, Clark, A.M., Ph.D., LL.D.</b> Curator of Anthropology, American Museum of Natural History, New York 24, N. Y.	1924
<b>Witmer, Lightner, A.M., Ph.D.</b> Professor Emeritus of Psychology, University of Pennsylvania. Box 186, Devon, Pa.	1897
<b>Wolman, Leo, Ph.D.</b> Professor of Economics, Columbia University. National Bureau of Economic Research, 1819 Broadway, New York 23, N. Y.	1941

	Date of Election
<b>Woodworth, Robert Sessions, A.B., A.M., Ph.D., Sc.D., LL.D.</b>	1936
Professor Emeritus of Psychology, Columbia University, New York 27, N. Y.	
<b>Wright, Frederick E., Ph.D.</b>	1914
Petrologist, Geophysical Laboratory, Carnegie Institution of Washington. 2134 Wyoming Avenue, Washington, D. C.	
<b>Wright, Quincy, A.B., A.M., Ph.D., LL.D.</b>	1943
Professor of International Law, University of Chicago, Chicago 15, Ill.	
<b>Wright, Sewall, B.S., M.S., Sc.D.</b>	1932
Ernest D. Burton Distinguished Service Professor of Zoology, University of Chicago. 5762 Harper Avenue, Chicago 37, Ill.	
<b>Wright, William Hammond, D.Sc.</b>	1935
Astronomer, Director (ret.), Lick Observatory, Mount Hamilton, Calif.	
<b>Yeatman, Pope, E.M., D.E.</b>	1920
Mining Engineer. 165 Broadway, New York 6, N. Y.	
<b>Yerkes, Robert Mearns, Ph.D., D.Sc., LL.D.</b>	1936
Professor of Psychobiology, Yale University, 333 Cedar Street, New Haven 11, Conn.	
<b>Young, James Thomas, Ph.D.</b>	1933
Political Scientist, Professor of Public Administration, University of Pennsylvania, Philadelphia 4, Pa.	
<b>Young, Owen D., A.B., D.H.L., LL.B., Litt.D., D.C.S.</b>	1929
Lawyer, Honorary Chairman, General Electric Company. 570 Lexington Avenue, New York 22, N. Y.	
<b>Zeleny, John, M.A., Ph.D.</b>	1915
Professor Emeritus of Physics, Yale University. 44 Cold Spring Street, New Haven, Conn.	

Total Resident Members—473.

December 31, 1943.



## FOREIGN MEMBERS

	Date of Election
<b>Adrian, Edgar Douglas, M.A., M.D., Sc.D., LL.D., F.R.S.</b> Professor of Physiology, Cambridge University. St. Chad's, Grange Road, Cambridge, England.	1938
<b>Alonso, Amado, Ph.D., LL.D.</b> Director, Instituto de Filología, and Professor, University of Buenos Aires, Buenos Aires, Argentina.	1942
<b>Beazley, John Davidson, M.A., F.B.A., Hon. Litt.A., Hon. Litt.D., Hon. Ph.D.</b> Professor of Classical Archaeology, Oxford University, Oxford, England.	1943
<b>Bell, Harold Idris, D.Litt., F.B.A., F.S.A.</b> Keeper of the Manuscripts and Egerton Librarian, British Museum, London, W.C.1, England.	1941
<b>Beneš, Eduard, Ph.D., LL.D.</b> Formerly President, Czechoslovak Republic.	1939
<b>Bohr, Niels Henrik David, Dr.phil.</b> Professor of Theoretical Physics, University of Copenhagen; Director, Institute of Theoretical Physics. G. 1 Carlsberg, Copenhagen, Denmark.	1940
<b>Bragg, Sir William Lawrence, F.R.S., M.A., Hon. D.Sc., Hon. Ph.D.</b> Professor of Experimental Physics, Cambridge University, Cambridge, England.	1943
<b>de Broglie, Prince Louis Victor, D.Sc.</b> Professor of Theoretical Physics, University of Paris. 94 Rue Perronet, Neuilly-sur-Seine, France.	1939
<b>Brouwer, Luitzen Egbertus Jan, Ph.D.</b> Professor of Mathematics, University of Amsterdam, Amsterdam, Netherlands.	1943
<b>Craigie, Sir William A., LL.D., D.Litt.</b> Professor Emeritus of English, University of Chicago. Ridgehurst, Watlington, Oxford, England.	1942

	Date of Election
<b>Cumont, Franz Valery Marie, D.Litt.</b> Authority on Religions of the Roman Empire. 19 Corso d'Italia, Rome, Italy.	1940
<b>Dale, Sir Henry Hallett, M.D., D.Sc., LL.D., F.R.S.</b> Director, National Institute for Medical Research. Mt. Vernon House, Hampstead, London, N.W.3, England.	1939
<b>Debye, Peter</b> Chairman of the Department of Chemistry and Professor of Chemistry, Cornell University, Ithaca, N. Y.	1936
<b>Dirac, Paul Adrien Maurice, Ph.D., F.R.S.</b> Lucasian Professor of Mathematics, Cambridge University. St. John's College, Cambridge, England.	1938
<b>Eddington, Sir Arthur Stanley, M.A., B.Sc., D.Sc., LL.D., F.R.S.</b> Astronomer, Director, The Observatory, Cambridge, England.	1931
<b>Fisher, Ronald Aylmer, Sc.D., LL.D., F.R.S.</b> Galton Professor of Eugenics, University College, London. The Galton Laboratory, Rothamsted Experimental Station, Harpenden, Hertfordshire, England.	1941
<b>García, Godofredo</b> Engineer and Mathematician, Professor in the Faculty of Sciences, University of San Marcos, Lima, Peru.	1943
<b>Gardiner, Alan Henderson, M.A., F.B.A.</b> Egyptologist, Editor, <i>Journal of Egyptian Archaeology</i> . Upton House, Wonston, Nr. Winchester, Hants, London, England.	1943
<b>Gooch, George Peabody, D.Litt.</b> Honorary Fellow, Trinity College, Cambridge University. 76 Campden Hill Road, London, W.8, England.	1939
<b>Hardy, Godfrey Harold, D.Sc., LL.D., D.Phil.</b> Sadleirian Professor of Pure Mathematics, University of Cambridge; Fellow, Trinity College, Cambridge, England.	1939
<b>Heckscher, Eli Filip, Ph.D., D.Sc.</b> Research Professor of Economic History, University of Stockholm. Baldersgatan 10 a, Stockholm, Sweden.	1940

	Date of Election
<b>Heisenberg, Werner, Ph.D.</b> Professor of Theoretical Physics, University of Leipzig. Bozenerweg 14, Leipzig, Germany.	1937
<b>Hertzprung, Ejnar</b> Director, Leiden Observatory, Leiden, Netherlands.	1941
<b>Hill, Archibald Vivian, Sc.D., LL.D., M.D.</b> Physiologist, Foulerton Research Professor and Secretary of the Royal Society. University of London, University College, Gower Street, London, W.C.1, England.	1938
<b>Hjort, Johan, Ph.D., Sc.D.</b> Professor of Marine Biology, Oslo University, Oslo, Norway.	1939
<b>Hopkins, Sir Frederick Gowland, M.A., M.B., D.Sc., LL.D., D.C.L., F.R.S.</b> Physiologist, Professor of Biochemistry, University of Cambridge. Saxmeadham, Grange Road, Cambridge, England.	1937
<b>Hu Shih, Ph.D., LL.D., Litt.D., L.H.D., D.C.L.</b> Retired Chinese Ambassador to United States. 104 East 81st Street, New York 28, N. Y.	1936
<b>Irvine, Sir James Colquhoun, C.B.E., Ph.D., Sc.D., LL.D., D.C.L., F.R.S.</b> Chemist, Principal and Vice-chancellor, University of St. Andrews, Fifeshire, Scotland.	1933
<b>Janet, Pierre, Dr. ès lettres, Dr. en médecine, Sc.D. .</b> Professor of Psychology, Collège de France; Director, Laboratoire de Psychologie pathologique, Clinique de la Salpêtrière. Rue de Varenne 54, Paris VII, France.	1940
<b>Jones, Harold Spencer, Sc.D., F.R.S.</b> Astronomer Royal of Great Britain. Flamsteed House, Greenwich Park, S.E. 10, England.	1942
<b>Keith, Sir Arthur, Kt., F.R.S., M.D., D.Sc., F.R.C.S., LL.D.</b> Anthropologist, Master, Buckston Browne Research Farm, Downe, Farnborough, Kent, England.	1931
<b>Keith, Arthur Berriedale, D.C.L., D.Litt., LL.D.</b> Barrister at Law, Advocate and Orientalist, Regius Professor of Sanskrit and Comparative Philology, Lecturer on the Constitution of the British Empire, University of Edinburgh, Edinburgh, Scotland.	1935

	Date of Election
<b>Kenyon, Sir Frederic George, M.A., D.Litt., LL.D., L.H.D., Ph.D.</b>	1937
Archaeologist and Philologist, Secretary, British Academy; Formerly President, London Society of Antiquaries; Formerly Director, British Museum. Kirkstead, Godstone, Surrey, England.	
<b>Kramers, Hendrik Anthony, Dr.</b>	1942
Professor of Theoretical Physics, University of Leiden, Leiden, Netherlands.	
<b>Krogh, August, Ph.D., LL.D., M.D., Sc.D.</b>	1941
Professor of Zoophysiology, Copenhagen University, Copenhagen, Denmark.	
<b>de Margerie, Emmanuel</b>	1932
Geologist, Formerly President, Geological Society of France. 110 Rue du Bac, Paris VII, France.	
<b>Méndez-Pereira, Octavio, Ph.D., LL.D.</b>	1942
Formerly Rector, University of Panama; Apartado 320, Panamá, Republica de Panamá.	
<b>Nilsson, Martin P., Ph.D.</b>	1939
Professor of Classical Archaeology and Ancient History, University of Lund. Bredgatan 25, Lund, Sweden.	
<b>Penck, Albrecht F. K., Ph.D., Sc.D.</b>	1908
Professor Emeritus of Geography, University of Berlin. Meierottostrasse 511, Berlin W15, Germany.	
<b>Pidal, Ramón Menéndez, Dr. honoris causa</b>	1940
Professor of Romance Philology, University of Madrid, Madrid, Spain.	
<b>Planck, Max, Ph.D., M.D., D.Sc.</b>	1933
Professor of Physics, University of Berlin, Berlin, Germany.	
<b>Prain, Sir David, Kt., M.A., M.B., LL.D., F.R.S.</b>	1917
Botanist, Formerly Trustee, British Museum and Director, Royal Botanic Gardens, Kew. The Well Farm, Whyteleafe, Surrey, England.	
<b>Rappard, William E., Dr.jur., Litt.D., LL.D.</b>	1941
Professor of Public Finance and Political Science, University of Geneva; Director, Graduate Institute of International Studies, Geneva, Switzerland.	

	Date of Election
<b>Richardson, Sir Owen Willans, Kt., M.A., D.Sc., LL.D., F.R.S.</b>	1910
Physicist, Yarrow Research Professor of the Royal Society; Director of Research in Physics, Kings College, London. Chandos Lodge, Alton, Hants, England.	
<b>Rist, Charles, LL.D.</b>	1938
Professor of Political Economy, University of Paris. 18 bis, Rue du Parc de Clagny, Versailles, France.	
<b>Svedberg, Theodor, Ph.D.</b>	1941
Professor of Physical Chemistry, Upsala University, Upsala, Sweden.	
<b>Tawney, Richard Henry</b>	1942
Professor of Economic History, University of London; Attached to British Embassy, Washington, D. C.	
<b>Thompson, Sir D'Arcy Wentworth, D.Litt., D.Sc., LL.D.</b>	1941
Professor of Natural History, St. Andrews University, St. Andrews, Scotland.	
<b>Toynbee, Arnold Joseph, D. Litt.</b>	1941
Director of Studies, Royal Institute of International Affairs; Research Professor of International History, University of London, London, England.	
<b>Vinogradov, Ivan Matveitch, Dr.</b>	1942
Director, Steklov Institute of Mathematics of the Academy of Sciences of the U.S.S.R., Moscow, U.S.S.R.	
<b>Wilkins, Sir Hubert, Kt., M.C., F.R.G.S., M.B.O.U.</b>	1930
Consultant, Military Planning Division, U. S. Army. City Club, 55 West 44th Street, New York 18, N. Y.	
<b>van Zeeland, Paul</b>	1942
Formerly Prime Minister and Minister of Foreign Affairs and of Foreign Commerce of Belgium. Co-ordinating Foundation, 30 Rockefeller Plaza, New York 20, N. Y.	

Total Foreign Members—52.

December 31, 1943.

## CLASSIFIED LIST OF MEMBERS

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### CLASS I. MATHEMATICAL AND PHYSICAL SCIENCES

#### *Mathematics*

Alexander, James W.	Princeton, N. J.
Bateman, Harry	Pasadena, Calif.
Bell, Eric Temple	Pasadena, Calif.
Birkhoff, George David	Cambridge, Mass.
Bliss, Gilbert Ames	Chicago, Ill.
Brouwer, Luitzen Egbertus Jan	Amsterdam, Netherlands
Coble, Arthur Byron	Urbana, Ill.
Dirac, Paul Adrien Maurice	Cambridge, England
Dresden, Arnold	Swarthmore, Pa.
Eisenhart, Luther Pfahler	Princeton, N. J.
Evans, Griffith Conrad	Berkeley, Calif.
Fisher, Ronald Aylmer	Harpenden, Hertfordshire, England
Gracia, Godofredo	Lima, Peru
Hardy, Godfrey Harold	Cambridge, England
Huntington, Edward Vermilye	Cambridge, Mass.
Kline, John Robert	Philadelphia, Pa.
Lefschetz, Solomon	Princeton, N. J.
Lovett, Edgar Odell	Houston, Texas
Morse, Marston	Princeton, N. J.
Murnaghan, Francis Dominic	Baltimore, Md.
von Neumann, John	Princeton, N. J.
Stone, Marshall Harvey	Cambridge, Mass.
Veblen, Oswald	Princeton, N. J.
Vinogradov, Ivan M.	Moscow, Russia
Weyl, Hermann	Princeton, N. J.

#### *Astronomy*

Abbot, Charles Greeley	Washington, D. C.
Adams, Walter Sydney	Pasadena, Calif.
Aitken, Robert Grant	Berkeley, Calif.
Douglass, Andrew Ellicott	Tucson, Ariz.
Eddington, Arthur Stanley	Cambridge, England
Gaposchkin, Cecilia Payne	Cambridge, Mass.

Hertzsprung, Ejnar.....	Leiden, Netherlands
Hubble, Edwin P.....	Pasadena, Calif.
Jones, Harold Spencer.....	Greenwich Park, England
Lampland, Carl O.....	Flagstaff, Ariz.
Leuschner, Armin Otto.....	Berkeley, Calif.
McMath, Robert Reynolds.....	Pontiac, Mich.
Menzel, Donald Howard.....	Washington, D. C.
Merrill, Paul Willard.....	Pasadena, Calif.
Miller, John Anthony.....	Wallingford, Pa.
Mitchell, Samuel Alfred.....	University, Va.
Moulton, Forest Ray.....	Washington, D. C.
Olivier, Charles P.....	Upper Darby, Pa.
Russell, Henry Norris.....	Princeton, N. J.
Seares, Frederick Hanley.....	Pasadena, Calif.
Shapley, Harlow.....	Cambridge, Mass.
Slipher, Vesto Melvin.....	Flagstaff, Ariz.
Stebbins, Joel.....	Madison, Wis.
Struve, Otto.....	Williams Bay, Wis.
Tucker, Richard Hawley.....	Palo Alto, Calif.
Wright, William Hammond.....	Mt. Hamilton, Calif.

### *Physics*

Adams, Edwin Plimpton.....	Princeton, N. J.
Anderson, Carl David.....	Pasadena, Calif.
Beams, Jesse Wakefield.....	University, Va.
Birge, Raymond Thayer.....	Berkeley, Calif.
Bohr, Niels Henrik David.....	Copenhagen, Denmark
Bowen, Ira Sprague.....	Pasadena, Calif.
Bragg, William Lawrence.....	Cambridge, England
Bridgman, Percy Williams.....	Cambridge, Mass.
Briggs, Lyman J.....	Washington, D. C.
de Broglie, Louis Victor.....	Neuilly-sur-Seine, France
Buckley, Oliver Ellsworth.....	New York, N. Y.
Compton, Arthur Holly.....	Chicago, Ill.
Compton, Karl Taylor.....	Cambridge, Mass.
Coolidge, William David.....	Schenectady, N. Y.
Crew, Henry.....	Evanston, Ill.
Darrow, Karl Kelchner.....	New York, N. Y.
Davissou, Clinton J.....	New York, N. Y.
Debye, Peter.....	Ithaca, N. Y.
Dempster, Arthur Jeffrey.....	Chicago, Ill.
DuBridge, Lee Alvin.....	Belmont, Mass.
Einstein, Albert.....	Princeton, N. J.
Fermi, Enrico.....	New York, N. Y.

Foote, Paul Darwin.....	Pittsburgh, Pa.
Franck, James.....	Chicago, Ill.
Heisenberg, Werner.....	Leipzig, Germany
Humphreys, William Jackson.....	Washington, D. C.
Ives, Herbert E.....	Montclair, N. J.
Kramers, Hendrik A.....	Leiden, Netherlands
Lawrence, Ernest Orlando.....	Berkeley, Calif.
Loomis, Alfred Lee.....	Tuxedo Park, N. Y.
Lyman, Theodore.....	Cambridge, Mass.
Millikan, Robert Andrews.....	Pasadena, Calif.
Mulliken, Robert Sanderson.....	Chicago, Ill.
Planck, Max.....	Berlin, Germany
Rabi, Isidor Isaac.....	New York, N. Y.
Richards, Horace Clark.....	Philadelphia, Pa.
Richardson, Owen Willans.....	Alton, Hants, England
Robertson, Howard Percy.....	Princeton, N. J.
See, Thomas Jefferson Jackson.....	Vallejo, Calif.
Slater, John Clarke.....	Cambridge, Mass.
Swann, William Francis Gray.....	Swarthmore, Pa.
Tate, John Torrence.....	Minneapolis, Minn.
Tolman, Richard Chace.....	Pasadena, Calif.
Tuve, Merle Antony.....	Washington, D. C.
Van Vleck, John Hasbrouck.....	Cambridge, Mass.
Webster, David Locke.....	Stanford University, Calif.
Wilson, Harold Albert.....	Houston, Texas
Zeleny, John.....	New Haven, Conn.

### *Chemistry*

Adams, Roger.....	Urbana, Ill.
Andrews, Donald Hatch.....	Baltimore, Md.
†Baekeland, Leq H.....	New York, N. Y.
Bancroft, Wilder Dwight.....	Ithaca, N. Y.
Bogert, Marston Taylor.....	New York, N. Y.
Clarke, Hans Thacher.....	New York, N. Y.
Clark, William Mansfield.....	Baltimore, Md.
Conant, James Bryant.....	Cambridge, Mass.
Cottrell, Frederick Gardner.....	Washington, D. C.
Du Pont, Pierre Samuel.....	Wilmington, Del.
Eyring, Henry.....	Princeton, N. J.
Fieser, Louis Frederick.....	Belmont, Mass.
Giauque, William Francis.....	Berkeley, Calif.
Gomberg, Moses.....	Ann Arbor, Mich.
Harkins, William Draper.....	Chicago, Ill.

† Deceased.



Hawk, Philip Bovier.....	Long Island City, N. Y.
Hopkins, B Smith.....	Urbana, Ill.
Hulett, George A.....	Princeton, N. J.
Irvine, James Colquhoun.....	Fifeshire, Scotland
Keyes, Frederick George.....	Cambridge, Mass.
Kistiakowsky, George Bogdan.....	Pittsburgh, Pa.
Kraus, Charles August.....	Providence, R. I.
Lamb, Arthur Becket.....	Cambridge, Mass.
Langmuir, Irving.....	Schenectady, N. Y.
Lewis, Gilbert Newton.....	Berkeley, Calif.
Lind, Samuel Colville.....	Minneapolis, Minn.
MacInnes, Duncan Arthur.....	New York, N. Y.
Mees, Charles Edward Kenneth.....	Rochester, N. Y.
Northrop, John Howard.....	Princeton, N. J.
Patterson, Lamar Gray.....	Perdido Beach, Ala.
Pauling, Linus Carl.....	Pasadena, Calif.
Smyth, Charles Phelps.....	Princeton, N. J.
Stanley, Wendell Meredith.....	Princeton, N. J.
Svedberg, Theodor.....	Upsala, Sweden
Taylor, Hugh Stott.....	Princeton, N. J.
Urey, Harold Clayton.....	Leonia, N. J.
Van Slyke, Donald Dexter.....	New York, N. Y.
Whitmore, Frank Clifford.....	State College, Pa.
Whitney, Willis R.....	Schenectady, N. Y.
Williams, Robert R.....	Summit, N. J.

*Engineering*

Bush, Vannevar.....	Washington, D. C.
Davis, Harvey N.....	Hoboken, N. J.
Derleth, Charles, Jr.....	Berkeley, Calif.
Dunn, Gano.....	New York, N. Y.
Durand, William Frederick.....	Stanford University, Calif.
Hoover, Herbert.....	Stanford University, Calif.
Hunsaker, Jerome Clarke.....	Boston, Mass.
Jackson, Dugald Caleb.....	Cambridge, Mass.
Jewett, Frank Baldwin.....	New York, N. Y.
Kármán, Theodor von.....	Pasadena, Calif.
Kettering, Charles Franklin.....	Dayton, Ohio
Pender, Harold.....	Philadelphia, Pa.
Timoshenko, Stephen P.....	Palo Alto, Calif.
Westergaard, Harald Malcolm.....	Cambridge, Mass.
Wetherill, Samuel Price.....	Philadelphia, Pa.
Yeatman, Pope.....	New York, N. Y.

## CLASS II. GEOLOGICAL AND BIOLOGICAL SCIENCES

### *Geology, Paleontology, Geography*

Berkey, Charles Peter.....	New York, N. Y.
Berry, Edward Wilber.....	Baltimore, Md.
Blackwelder, Eliot.....	Stanford University, Calif.
Bowen, Norman L.....	Chicago, Ill.
Bowman, Isaiah.....	Baltimore, Md.
Bryant, William L.....	Providence, R. I.
Buddington, Arthur F.....	Princeton, N. J.
Byrd, Richard Evelyn.....	Boston, Mass.
Case, Ermine Cowles.....	Ann Arbor, Mich.
Chamberlin, Rollin Thomas.....	Chicago, Ill.
Chaney, Ralph Works.....	Berkeley, Calif.
Cross, Whitman.....	Chevy Chase, Md.
Daly, Reginald Aldworth.....	Cambridge, Mass.
Day, Arthur L.....	Bethesda, Md.
Dunbar, Carl Owen.....	New Haven, Conn.
Gregory, Herbert Ernest.....	Honolulu, Hawaii
Gregory, William King.....	New York, N. Y.
Hobbs, William Herbert.....	Ann Arbor, Mich.
†Johnson, Douglas.....	New York, N. Y.
Lawson, Andrew Cowper.....	Berkeley, Calif.
Leith, Charles Kenneth.....	Madison, Wis.
de Margerie, Emmanuel.....	Paris, France
Merriam, John C.....	Pasadena, Calif.
Penck, Albrecht F. K.....	Berlin, Germany
Reid, Harry Fielding.....	Baltimore, Md.
Scott, William Berryman.....	Princeton, N. J.
Simpson, George Gaylord.....	New York, N. Y.
Stefansson, Vilhjalmur.....	New York, N. Y.
Vaughan, Thomas Wayland.....	Washington, D. C.
Warren, Charles Hyde.....	New Haven, Conn.
Wilkins, Hubert.....	New York, N. Y.
Willis, Bailey.....	Stanford University, Calif.
Wright, Frederick E.....	Washington, D. C.

### *Zoology, Anatomy*

Andrews, Roy Chapman.....	Colebrook, Conn.
Barbour, Thomas.....	Cambridge, Mass.

† Deceased.

Bigelow, Henry Bryant.....	Cambridge, Mass.
Birge, Edward Asahel.....	Madison, Wis.
Calvert, Philip Powell.....	Cheyney, Pa.
Castle, William Ernest.....	Berkeley, Calif.
Chapman, Frank Michler.....	Coconut Grove, Fla.
Cockerell, Theodore D. A.....	Boulder, Colo.
Conklin, Edwin Grant.....	Princeton, N. J.
Corner, George Washington.....	Baltimore, Md.
Dahlgren, Ulric.....	Princeton, N. J.
†Davenport, Charles Benedict....	Cold Spring Harbor, L. I., N. Y.
Detwiler, Samuel Randall.....	New York, N. Y.
Dobzhansky, Theodosius.....	New York, N. Y.
Dunn, Leslie Clarence.....	New York, N. Y.
Harrison, Ross G.....	New Haven, Conn.
Hisaw, Frederick Lee.....	Cambridge, Mass.
Hjort, Johan.....	Oslo, Norway
Howard, Leland Ossian.....	Washington, D. C.
Jennings, Herbert S.....	Los Angeles, Calif.
Lewis, Warren Harmon.....	Philadelphia, Pa.
Kofoed, Charles A.....	Berkeley, Calif.
Lillie, Frank Rattray.....	Chicago, Ill.
McClung, Clarence E.....	Swarthmore, Pa.
McClure, Charles F. W.....	Princeton, N. J.
McGregor, James Howard.....	New York, N. Y.
Mark, Edward Laurens.....	Cambridge, Mass.
Metz, Charles William.....	Philadelphia, Pa.
Miller, Gerrit Smith, Jr.....	Washington, D. C.
Moore, J. Percy.....	Philadelphia, Pa.
Morgan, Thomas Hunt.....	Pasadena, Calif.
Painter, Theophilus Shickel.....	Austin, Texas
Parker, George Howard.....	Cambridge, Mass.
Ruthven, Alexander G.....	Ann Arbor, Mich.
Schaeffer, J. Parsons.....	Philadelphia, Pa.
Schultz, Adolph H.....	Baltimore, Md.
Streeter, George Linius.....	Baltimore, Md.
Sturtevant, Alfred Henry.....	Pasadena, Calif.
Sumner, Francis Bertody.....	La Jolla, Calif.
Taliaferro, William Hay.....	Chicago, Ill.
Thompson, D'Arcy Wentworth.....	St. Andrews, Scotland
Weed, Lewis Hill.....	Baltimore, Md.
Wetmore, Alexander.....	Washington, D. C.
Wright, Sewall.....	Chicago, Ill.

† Deceased.

*Botany, Bacteriology*

Allen, Charles Elmer.....	Madison, Wis.
Arthur, Joseph Charles.....	Lafayette, Ind.
Bailey, Irving Widmer.....	Cambridge, Mass.
Bailey, Liberty Hyde.....	Ithaca, N. Y.
Bartlett, Harley Harris.....	Ann Arbor, Mich.
Blakeslee, Albert Francis.....	Northampton, Mass.
Campbell, Douglas Houghton.....	Stanford University, Calif.
Cleland, Ralph Erskine.....	Bloomington, Ind.
Crocker, William.....	Yonkers, N. Y.
Davis, Bradley Moore.....	Ann Arbor, Mich.
Duggar, Benjamin Minge.....	Pearl River, N. Y.
Fernald, Merritt Lyndon.....	Cambridge, Mass.
Harper, Robert A.....	Bedford, Va.
Jones, Lewis Ralph.....	Madison, Wis.
Kunkel, Louis Otto.....	Princeton, N. J.
Livingston, Burton E.....	Riderwood, Md.
MacDougal, Daniel Trembly.....	Carmel, Calif.
Merrill, Elmer Drew.....	Jamaica Plain, Mass.
Moore, George Thomas.....	St. Louis, Mo.
Novy, Frederick G.....	Ann Arbor, Mich.
Prain, David.....	Whyteleafe, Surrey, England
Robbins, William Jacob.....	New York, N. Y.
Schramm, Jacob Richard.....	Philadelphia, Pa.
Shull, George Harrison.....	Princeton, N. J.
Sinnott, Edmund Ware.....	New Haven, Conn.
Spoehr, Herman Augustus.....	Stanford University, Calif.
Stadler, Lewis John.....	Columbia, Mo.
Stakman, Elvin Charles.....	St. Paul, Minn.
Trelease, Wilfam.....	Urbana, Ill.

*Anthropology, Psychology*

Angell, James Rowland.....	New Haven, Conn.
Carmichael, Leonard.....	Medford, Mass.
†Cattell, James McKeen.....	Garrison, N. Y.
Cole, Fay-Cooper.....	Chicago, Ill.
Hooton, Earnest A.....	Cambridge, Mass.
Hunter, Walter Samuel.....	Providence, R. I.
Janet, Pierre.....	Paris, France
Keith, Arthur.....	Farnborough, Kent, England

† Deceased.

Köhler, Wolfgang.....	Swarthmore, Pa.
Lashley, Karl Spencer.....	Orange Park, Fla.
MacCurdy, George Grant.....	Old Lyme, Conn.
Thorndike, Edward L.....	New York, N. Y.
Tozzer, Alfred Marston.....	Cambridge, Mass.
Wissler, Clark.....	New York, N. Y.
Witmer, Lightner.....	Devon, Pa.
Woodworth, Robert Sessions.....	New York, N. Y.
Yerkes, Robert Mearns.....	New Haven, Conn.

*Physiology, Pathology*

Adrian, Edgar Douglas.....	Cambridge, England
Benedict, Francis Gano.....	Machiasport, Maine
Bronk, Detlev W.....	Philadelphia, Pa.
Cannon, Walter Bradford.....	Boston, Mass.
Carlson, Anton Julius.....	Chicago, Ill.
Dale, Henry Hallett.....	London, England
Doisy, Edward Adelbert.....	Webster Groves, Mo.
Erlanger, Joseph.....	St. Louis, Mo.
Flexner, Simon.....	New York, N. Y.
Forbes, Alexander.....	Boston, Mass.
Gasser, Herbert Spencer.....	New York, N. Y.
Gies, William J.....	New York, N. Y.
Goodpasture, Ernest William.....	Nashville, Tenn.
Harvey, E. Newton.....	Princeton, N. J.
Hastings, A. Baird.....	Boston, Mass.
†Henderson, Yandell.....	New Haven, Conn.
Hill, Archibald Vivian.....	London, England
Hopkins, Frederick Gowland.....	Cambridge, England
Howell, William Henry.....	Baltimore, Md.
Jacobs, Merkel Henry.....	Philadelphia, Pa.
Krogh, August.....	Copenhagen, Denmark
Lillie, Ralph Stayner.....	Chicago, Ill.
Loeb, Leo.....	St. Louis, Mo.
Long, Esmond Ray.....	Philadelphia, Pa.
Murlin, John Raymond.....	Rochester, N. Y.
Osterhout, Winthrop J. V.....	New York, N. Y.
Richards, Alfred Newton.....	Bryn Mawr, Pa.
Riddle, Oscar.....	Cold Spring Harbor, L. I., N. Y.
Tyzzer, Ernest Edward.....	Wakefield, Mass.
Whipple, George Hoyt.....	Rochester, N. Y.

† Deceased.

*Medicine, Pharmacology, Surgery*

Carrel, Alexis.....	New York, N. Y.
Castle, William Bosworth.....	Boston, Mass.
Darrach, William.....	New York, N. Y.
DuBois, Eugene Floyd.....	New York, N. Y.
Graham, Evarts Ambrose.....	St. Louis, Mo.
Heiser, Victor George.....	Bantam, Conn.
Joslin, Elliott Proctor.....	Boston, Mass.
MacNider, William de Berniere.....	Chapel Hill, N. C.
Minot, George Richards.....	Boston, Mass.
Norris, George William.....	Dimock, Pa.
Packard, Francis Randolph.....	Philadelphia, Pa.
Pepper, William.....	Philadelphia, Pa.
Ravenel, Mazýck P.....	Columbia, Mo.
Rivers, Thomas Milton.....	Forest Hills, L. I., N. Y.
Rous, Peyton.....	New York, N. Y.

## CLASS III. SOCIAL SCIENCES

*Economics, Statistics, Sociology*

Barnard, Chester Irving.....	Newark, N. J.
Commons, John Rogers.....	Ft. Lauderdale, Fla.
Day, Edmund Ezra.....	Ithaca, N. Y.
Dodds, Harold Willis.....	Princeton, N. J.
Fetter, Frank Albert.....	Princeton, N. J.
Fisher, Irving.....	New Haven, Conn.
Gay, Edwin Francis.....	San Marino, Calif.
Heckscher, Eli Filip.....	Stockholm, Sweden
Huebner, Solomon Stephen.....	Merion, Pa.
Johnson, Alvin Saunders.....	Nyack, N. Y.
Johnson, Emory R.....	Philadelphia, Pa.
Kemmerer, Edwin Walter.....	Princeton, N. J.
MacIver, Robert Morrison.....	Palisades, N. Y.
Mitchell, Wesley Clair.....	New York, N. Y.
Moulton, Harold Glenn.....	Washington, D. C.
Ogburn, William Fielding.....	Chicago, Ill.
Patterson, Ernest Minor.....	Philadelphia, Pa.
Rappard, William E.....	Geneva, Switzerland
Rist, Charles.....	Versailles, France
Stewart, Walter W.....	Princeton, N. J.
Sprague, Oliver M. W.....	Boston, Mass.
Tawney, Richard Henry.....	Washington, D. C.

Viner, Jacob.....	Chicago, Ill.
Williams, John Henry.....	Cambridge, Mass.
Willits, Joseph Henry.....	New York, N. Y.
Wilson, Edwin Bidwell.....	Boston, Mass.
Wolman, Leo.....	New York, N. Y.
Young, James Thomas.....	Philadelphia, Pa.

### *Modern History*

Adams, James Truslow.....	Southport, Conn.
Armstrong, Hamilton Fish.....	New York, N. Y.
Beard, Charles Austin.....	New Milford, Conn.
Becker, Carl L.....	Ithaca, N. Y.
Bolton, Herbert Eugene.....	Berkeley, Calif.
Boyd, Julian Parks.....	Princeton, N. J.
Cheyney, Edward Potts.....	Media, Pa.
Farrand, Max.....	Bar Harbor, Maine
Ford, Guy Stanton.....	Washington, D. C.
Fox, Dixon Ryan.....	Schenectady, N. Y.
Freeman, Douglas Southall.....	Richmond, Va.
Gooch, George Peabody.....	London, England
Greene, Evarts B.....	Croton-on-Hudson, N. Y.
Hayes, Carlton Joseph Huntley.....	New York, N. Y.
Lingelbach, William E.....	Philadelphia, Pa.
McIlwain, Charles Howard.....	Belmont, Mass.
Morison, Samuel Eliot.....	Canton, Mass.
Read, Conyers.....	Washington, D. C.
Schlesinger, Arthur Meier.....	Cambridge, Mass.
Schmitt, Bernadotte Everly.....	Chicago, Ill.
Schuyler, Robert Livingston.....	New York, N. Y.
Seymour, Charles.....	New Haven, Conn.
Shotwell, James Thomson.....	New York, N. Y.
Sioussat, St. George Leakin.....	Chevy Chase, Md.
Wertenbaker, Thomas Jefferson.....	Princeton, N. J.

### *Jurisprudence*

Chamberlain, Joseph Perkins.....	New York, N. Y.
Corwin, Edward Samuel.....	Princeton, N. J.
Davis, John William.....	New York, N. Y.
Dickinson, John.....	Philadelphia, Pa.
Duane, Morris.....	Washington, D. C.
Frankfurter, Felix.....	Washington, D. C.
Goodrich, Herbert Funk.....	Philadelphia, Pa.

Hudson, Manley Ottmer.....	Cambridge, Mass.
Hughes, Charles Evans.....	Washington, D. C.
Jessup, Philip C.....	New York, N. Y.
Kelley, Nicholas.....	New York, N. Y.
Landis, James McCauley.....	Cambridge, Mass.
Miller, Hunter.....	Victoria, B. C., Canada
Moe, Henry Allen.....	New York, N. Y.
Moore, John Bassett.....	New York, N. Y.
Morris, Roland S.....	Philadelphia, Pa.
Pepper, George Wharton.....	Philadelphia, Pa.
Pound, Roscoe.....	Watertown, Mass.
Roberts, Owen J.....	Washington, D. C.
Rogers, Lindsay.....	New York, N. Y.
Scott, John Morin.....	Philadelphia, Pa.
Stone, Harlan Fiske.....	Washington, D. C.
Warren, Charles.....	Washington, D. C.
Wilson, George Grafton.....	Cambridge, Mass.
Wright, Quincy.....	Chicago, Ill.

*Administration, Government*

Beneš, Eduard.....	London, England
Butler, Nicholas Murray.....	New York, N. Y.
Crane, Robert Treat.....	New York, N. Y.
Delano, Frederic Adrian.....	Washington, D. C.
Fosdick, Raymond Blaine.....	New York, N. Y.
Gates, Thomas Sovereign.....	Philadelphia, Pa.
Gifford, Walter Sherman.....	New York, N. Y.
Keith, Arthur Berriedale.....	Edinburgh, Scotland
Lattimore, Owen.....	San Francisco, Calif.
McClelland, George William.....	Philadelphia, Pa.
Merriam, Charles Edward.....	Chicago, Ill.
Putnam, Herbert.....	Washington, D. C.
Rockefeller, John D., Jr.....	New York, N. Y.
Rowe, Leo S.....	Washington, D. C.
Wallace, Henry Agard.....	Washington, D. C.
Young, Owen D.....	New York, N. Y.
van Zeeland, Paul.....	New York, N. Y.

*Affairs*

Burgess, Warren Randolph.....	New York, N. Y.
Douglas, Lewis Williams.....	New York, N. Y.
Fels, Samuel S.....	Philadelphia, Pa.



Hayward, Nathan.....	Philadelphia, Pa.
Hopkinson, Edward, Jr.....	Philadelphia, Pa.
Jenks, John Story.....	Philadelphia, Pa.
Johnson, Eldridge Reeves.....	Camden, N. J.
Lamont, Thomas William.....	New York, N. Y.
Leeds, Morris Evans.....	Philadelphia, Pa.
Mason, William Smith.....	Pasadena, Calif.
Morgan, Marshall S.....	Philadelphia, Pa.
Morris, Lawrence J.....	Philadelphia, Pa.
Rhoads, Charles James.....	Bryn Mawr, Pa.
Rosengarten, Adolph G.....	St. Davids, Pa.
Scattergood, J. Henry.....	Villa Nova, Pa.

#### CLASS IV. HUMANITIES

##### *Philosophy, Education*

Dewey, John.....	New York, N. Y.
Graves, Frank Pierrepont.....	Albany, N. Y.
Haney, John Louis.....	Philadelphia, Pa.
Hocking, William Ernest.....	Madison, N. H.
Hu Shih.....	New York, N. Y.
Lewis, Clarence Irving.....	Lexington, Mass.
Lovejoy, Arthur Oncken.....	Baltimore, Md.
Perry, Ralph Barton.....	Cambridge, Mass.
Singer, Edgar Arthur, Jr.....	Philadelphia, Pa.

##### *Ancient, Medieval and Cultural History*

Bell, Harold Idris.....	London, England
Chinard, Gilbert.....	Princeton, N. J.
Cumont, Franz Valery Marie.....	Rome, Italy
Ferguson, William Scott.....	Cambridge, Mass.
Leland, Waldo G.....	Washington, D. C.
Lowie, Robert H.....	Berkeley, Calif.
Nock, Arthur Darby.....	Cambridge, Mass.
Rostovtzeff, Michael I.....	New Haven, Conn.
Sarton, George.....	Cambridge, Mass.
Thorndike, Lynn.....	New York, N. Y.

##### *Archaeology, History of Art and Architecture*

Albright, William F.....	Baltimore, Md.
Beazley, John Davidson.....	Oxford, England

Blegen, Carl William.....	Washington, D. C.
Carpenter, Rhys.....	Downingtown, Pa.
Chase, George Henry.....	Cambridge, Mass.
Cret, Paul Philippe.....	Philadelphia, Pa.
Dinsmoor, William Bell.....	New York, N. Y.
Gardiner, Alan Henderson.....	London, England
Holland, Leicester Bodine.....	Philadelphia, Pa.
Jayne, Horace Howard Furness.....	New York, N. Y.
Kenyon, Frederic George.....	Godstone, Surrey, England
Kidder, Alfred Vincent.....	Cambridge, Mass.
Kimball, Fiske.....	Philadelphia, Pa.
Kroeber, Alfred Louis.....	Berkeley, Calif.
Meritt, Benjamin Dean.....	Princeton, N. J.
Morley, Sylvanus Griswold.....	Merida, Yucatan, Mexico
Nilsson, Martin P.....	Lund, Sweden
Richter, Gisela M. A.....	New York, N. Y.
Robinson, David Moore.....	Baltimore, Md.
Shear, Theodore Leslie.....	Princeton, N. J.
Swindler, Mary Hamilton.....	Bryn Mawr, Penna.
Vaillant, Georg Clapp.....	Lima, Peru
Winlock, Herbert Eustis.....	New York, N. Y.

*Languages and Literary History*

Alonso, Amado.....	Buenos Aires, Argentina
†Armstrong, Edward Cooke.....	Princeton, N. J.
Beeson, Charles Henry.....	Chicago, Ill.
Bloomfield, Leonard.....	New Haven, Conn.
Bonner, Campbell.....	Ann Arbor, Mich.
Buck, Carl Darling.....	Chicago, Ill.
Capps, Edward.....	Princeton, N. J.
Craigie, Sir William A.....	Oxford, England
Edgerton, Franklin.....	New Haven, Conn.
Gulick, Charles Burton.....	Cambridge, Mass.
Hendrickson, George Lincoln.....	New Haven, Conn.
Lancaster, Henry Carrington.....	Baltimore, Md.
McDaniel, Walton Brooks.....	Coconut Grove, Fla.
Matthews, Albert.....	Boston, Mass.
Méndez-Pereira, Octavio.....	Panama City, Panama
Montgomery, James Alan.....	Philadelphia, Pa.
Nitze, William Albert.....	Los Angeles, Calif.
Osgood, Charles Grosvenor.....	Princeton, N. J.
Pidal, Ramón Menéndez.....	Madrid, Spain

† Deceased.

Prince, John Dyneley.....	New York, N. Y.
Rand, Edward Kennard.....	Cambridge, Mass.
Sanders, Henry A.....	Ann Arbor, Mich.
Speiser, Ephraim Avigdor.....	Philadelphia, Pa.
Sturtevant, Edgar Howard.....	New Haven, Conn.
Tatlock, John S. P.....	Berkeley, Calif.
Toynbee, Arnold Joseph.....	London, England

*Letters and Fine Arts*

Adams, Joseph Quincy.....	Washington, D. C.
Aydelotte, Frank.....	Princeton, N. J.
Brooke, C. F. Tucker.....	New Haven, Conn.
Brooks, Van Wyck.....	Westport, Conn.
Cather, Willa.....	New York, N. Y.
Cross, Wilbur L.....	New Haven, Conn.
Damrosch, Walter Johannes.....	New York, N. Y.
Frost, Robert.....	South Shaftsbury, Vt.
Jones, Howard Mumford.....	Cambridge, Mass.
Lowes, John Livingston.....	Cambridge, Mass.
Lydenberg, Harry Miller.....	Washington, D. C.
Mann, Thomas.....	Palisades, Calif.
Mather, Frank Jewett, Jr.....	Washington Crossing, Pa.
Morey, Charles Rufus.....	Princeton, N. J.
Morris, Harrison Smith.....	Philadelphia, Pa.
Mumford, Lewis.....	Amenia, N. Y.
Nicolson, Marjorie Hope.....	New York, N. Y.
O'Neill, Eugene Gladstone.....	Danville, Calif.
Panofsky, Erwin.....	Princeton, N. J.
Quinn, Arthur Hobson.....	Bala-Cynwyd, Pa.
Replier, Agnes.....	Philadelphia, Pa.
Rosenbach, A. S. W.....	Philadelphia, Pa.
Schelling, Felix E.....	Mt. Vernon, N. Y.
Taylor, Deems.....	Stamford, Conn.
Van Doren, Carl.....	New York, N. Y.

## GEOGRAPHICAL OR PROFESSIONAL LOCATIONS OF MEMBERS

---

### RESIDENTS OF THE UNITED STATES

#### Alabama

##### PERDIDO BEACH

Patterson, Lamar Gray

#### Arizona

##### FLAGSTAFF

Lampland, Carl O.  
Slipher, Vesto Melvin

##### TUCSON

Douglass, Andrew Ellicott

#### California

##### BERKELEY

Aitken, Robert Grant  
Birge, Raymond Thayer  
Bolton, Herbert Eugene  
Castle, William Ernest  
Chaney, Ralph Works  
Derleth, Charles, Jr.  
Evans, Griffith Conrad  
Giauque, William Francis  
Kofoid, Charles A.  
Kroeber, Alfred Louis  
Lawrence, Ernest Orlando  
Lawson, Andrew Cowper  
Leuschner, Armin Otto  
Lewis, Gilbert Newton  
Lowie, Robert H.  
Tatlock, J. S. P.

##### CARMEL

MacDougal, Daniel Trembly

##### DANVILLE

O'Neill, Eugene Gladstone

#### LA JOLLA

Sumner, Francis Bertody

#### LOS ANGELES

Jennings, Herbert S.

#### MT. HAMILTON

Wright, William Hammond

#### PALISADES

Mann, Thomas

#### PALO ALTO

Tucker, Richard Hawley

#### PASADENA

Adams, Walter Sydney  
Anderson, Carl David  
Bateman, Harry  
Bell, Eric Temple  
Bowen, Ira Sprague  
Gay, Edwin Francis  
Hubble, Edwin P.  
Kármán, Theodor von  
Mason, William Smith  
Merriam, John C.  
Merrill, Paul Willard  
Millikan, Robert Andrews  
Morgan, Thomas Hunt  
Pauling, Linus Carl  
Seares, Frederick Hanley  
Sturtevant, Alfred Henry  
Tolman, Richard Chace

#### SAN FRANCISCO

Lattimore, Owen

## STANFORD UNIVERSITY

Blackwelder, Eliot  
 Campbell, Douglas Houghton  
 Durand, William Frederick  
 Hoover, Herbert  
 Spoehr, Herman Augustus  
 Timoshenko, Stephen P.  
 Webster, David Locke  
 Willis, Bailey

## VALLEJO

See, Thomas Jefferson Jackson

## Colorado

## BOULDER

Cockerell, Theodore D. A.

## Connecticut

## BANTAM

Heiser, Victor George

## COLEBROOK

Andrews, Roy Chapman

## NEW HAVEN

Angell, James Rowland  
 Bloomfield, Leonard  
 Brooke, C. F. Tucker  
 Cross, Wilbur L.  
 Dunbar, Carl O.  
 Edgerton, Franklin  
 Fisher, Irving  
 Harrison, Ross G.  
 †Henderson, Yandell  
 Hendrickson, George Lincoln  
 Rostovtzeff, Michael I.  
 Seymour, Charles  
 Sinnott, Edmund Ware  
 Sturtevant, Edgar Howard  
 Warren, Charles Hyde  
 Yerkes, Robert Mearns  
 Zeleny, John

† Deceased.

## NEW MILFORD

Beard, Charles Austin

## OLD LYME

MacCurdy, George Grant

## SOUTHPORT

Adams, James Truslow

## STAMFORD

Taylor, Deems

## WESTPORT

Brooks, Van Wyck

## Delaware

## WILMINGTON

Du Pont, Pierre Samuel

## District of Columbia

## WASHINGTON

Abbot, Charles Greeley  
 Adams, Joseph Quincy  
 Blegen, Carl William  
 Briggs, Lyman J.  
 Bush, Vannevar  
 Cottrell, Frederick Gardner  
 Cross, Whitman  
 Day, Arthur L.  
 Delano, Frederic Adrian  
 Duane, Morris  
 Ford, Guy Stanton  
 Frankfurter, Felix  
 Howard, Leland Ossian  
 Hu Shih  
 Hughes, Charles Evans  
 Humphreys, William Jackson  
 Leland, Waldo G.  
 Lydenberg, Harry Miller  
 Menzel, Donald Howard  
 Miller, Gerrit Smith, Jr.  
 Moulton, Forest Ray  
 Moulton, Harold Glenn  
 Putnam, Herbert

Read, Conyers  
 Roberts, Owen J.  
 Rowe, Leo S.  
 Stone, Harlan Fiske  
 Tawney, Richard H.  
 Tuve, Merle Antony  
 Vaughan, Thomas Wayland  
 Wallace, Henry Agard  
 Warren, Charles  
 Wetmore, Alexander  
 Wright, Frederick E.

### Florida

#### COCONUT GROVE

Chapman, Frank Michler  
 McDaniel, Walton Brooks

#### FT. LAUDERDALE

Commons, John Rogers

### Hawaii

#### HONOLULU

Gregory, Herbert Ernest

### Illinois

#### CHICAGO

Beeson, Charles Henry  
 Bliss, Gilbert Ames  
 Bowen, Norman L.  
 Buck, Carl Darling  
 Carlson, Anton Julius  
 Chamberlin, Rollin Thomas  
 Cole, Fay-Cooper  
 Compton, Arthur Holly  
 Dempster, Arthur Jeffrey  
 Franck, James  
 Harkins, William Draper  
 Lillie, Frank Rattray  
 Lillie, Ralph Stayner  
 Merriam, Charles Edward  
 Mulliken, Robert Sanderson  
 Nitze, William Albert  
 Ogburn, William Fielding

Schmitt, Bernadotte E.  
 Taliaferro, William Hay  
 Viner, Jacob  
 Wright, Quincy  
 Wright, Sewall

#### EVANSTON

Crew, Henry

#### URBANA

Adams, Roger  
 Coble, Arthur Byrön  
 Hopkins, B Smith  
 Trelease, William

### Indiana

#### BLOOMINGTON

Cleland, Ralph Erskine

### Maine

#### BAR HARBOR

Farrand, Max

#### MACHIASPORT

Benedict, Francis Gano

### Maryland

#### BALTIMORE

Albright, William F.  
 Andrews, Donald Hatch  
 Berry, Edward Wilber  
 Bowman, Isaiah  
 Clark, William Mansfield  
 Corner, George Washington  
 Howell, William Henry  
 Lancaster, Henry Carrington  
 Livingston, Burton E.  
 Lovejoy, Arthur Oncken  
 Murnaghan, Francis D.  
 Reid, Harry Fielding  
 Robinson, David Moore  
 Schultz, Adolph H.

Streeter, George Linus  
Weed, Lewis H.

## CHEVY CHASE

Sioussat, St. George Leakin

**Massachusetts**

## BELMONT

DuBridge, Lee A.

## BOSTON

Byrd, Richard Evelyn  
Cannon, Walter Bradford  
Castle, William Bosworth  
Forbes, Alexander  
Hastings, A. Baird  
Joslin, Elliott Proctor  
Matthews, Albert  
Merrill, Elmer Drew  
Minot, George Richards  
Sprague, Oliver M. W.  
Tyzzer, Ernest Edward  
Wilson, Edwin Bidwell

## CAMBRIDGE

Bailey, Irving Widmer  
Barbour, Thomas  
Bigelow, Henry Bryant  
Birkhoff, George David  
Bridgman, Percy Williams  
Chase, George Henry  
Compton, Karl Taylor  
Conant, James Bryant  
Daly, Reginald Aldworth  
Ferguson, William Scott  
Fernald, Merritt Lyndon  
Fieser, Louis Frederick  
Gaposchkin, Cecilia Payne  
Gulick, Charles Burton  
Hisaw, Frederick Lee  
Hooton, Earnest A.  
Hudson, Manley Ottmer  
Hunsaker, Jerome Clarke

Huntington, Edward V.  
Jackson, Dugald Caleb  
Jones, Howard Mumford  
Keyes, Frederick George  
Kidder, Alfred Vincent  
Kistiakowsky, George B.  
Lamb, Arthur Becket  
Landis, James McC.  
Lashley, Karl Spencer  
Lowes, John Livingston  
Lyman, Theodore  
McIlwain, Charles Howard  
Mark, Edward Laurens  
Morison, Samuel Eliot  
Nock, Arthur Darby  
Parker, George Howard  
Perry, Ralph Barton  
Pound, Roscoe  
Rand, Edward Kennard  
Sarton, George  
Schlesinger, Arthur Meier  
Shapley, Harlow  
Slater, John Clarke  
Stone, Marshall Harvey  
Tozzer, Alfred Marston  
Van Vleck, John Hasbrouck  
Westergaard, Harald M.  
Williams, John H.  
Wilson, George Grafton

## LEXINGTON

Lewis, Clarence I.

## MEDFORD

Carmichael, Leonard

## NORTHAMPTON

Blakeslee, Albert F.

**Michigan**

## ANN ARBOR

Bartlett, Harley Harris  
Bonner, Campbell  
Case, Ermine Cowles  
Davis, Bradley Moore

Gomberg, Moses  
 Hobbs, William Herbert  
 Novy, Frederick G.  
 Ruthven, Alexander G.  
 Sanders, Henry A.

PONTIAC  
 McMath, Robert R.

Minnesota

MINNEAPOLIS  
 Lind, Samuel Colville  
 Tate, John Torrence

ST. PAUL  
 Stakman, Elvin Charles

Missouri

COLUMBIA  
 Ravenel, Mazÿek  
 Stadler, Lewis John

ST. LOUIS  
 Erlanger, Joseph  
 Graham, Evarts Ambrose  
 Loeb, Leo  
 Moore, George Thomas

WEBSTER GROVES  
 Doisy, Edward A.

New Hampshire

MADISON  
 Hocking, William Ernest

New Jersey

CAMDEN  
 Johnson, Eldridge Reeves

HOBOKEN  
 Davis, Harvey Nathaniel

NEWARK  
 Barnard, Chester Irving

† Deceased.

## PRINCETON

Adams, Edwin Plimpton  
 Alexander, James W.  
 †Armstrong, Edward Cooke  
 Aydelotte, Frank  
 Boyd, Julian Parks  
 Buddington, Arthur F.  
 Capps, Edward  
 Chinard, Gilbert  
 Conklin, Edwin Grant  
 Corwin, Edward Samuel  
 Dahlgren, Ulric  
 Dodds, Harold Willis  
 Einstein, Albert  
 Eisenhart, Luther Pfahler  
 Eyring, Henry  
 Fetter, Frank Albert  
 Harvey, E. Newton  
 Hulett, George A.  
 Kemmerer, Edwin Walter  
 Kunkel, Louis O.  
 Lefschetz, Solomon  
 McClure, Charles F. W.  
 Mather, Frank Jewett, Jr.  
 Meritt, Benjamin Dean  
 Morey, Charles Rufus  
 Morse, Marston  
 von Neumann, John  
 Northrop, John Howard  
 Osgood, Charles Grosvenor  
 Panofsky, Erwin  
 Robertson, Howard Percy  
 Russell, Henry Norris  
 Scott, William Berryman  
 Shear, Theodore Leslie  
 Shull, George Harrison  
 Smyth, Charles Phelps  
 Stanley, Wendell Meredith  
 Stewart, Walter W.  
 Taylor, Hugh Stott  
 Veblen, Oswald



- Wertenbaker, Thomas J.  
 Weyl, Hermann
- SUMMIT
- Williams, Robert R.
- New York**
- ALBANY
- Graves, Frank Pierrepont
- AMENIA
- Mumford, Lewis
- COLD SPRING HARBOR
- †Davenport, Charles Benedict  
 Riddle, Oscar
- FOREST HILLS
- Rivers, Thomas M.
- ITHACA
- Bailey, Liberty Hyde  
 Bancroft, Wilder Dwight  
 Becker, Carl L.  
 Day, Edmund Ezra  
 Debye, Peter
- NEW YORK
- Armstrong, Hamilton Fish  
 †Baekeland, Leo H.  
 Berkey, Charles Peter  
 Bogert, Marston Taylor  
 Buckley, Oliver E.  
 Burgess, Warren R.  
 Butler, Nicholas Murray  
 Carrel, Alexis  
 Cather, Willa  
 †Cattell, James McKeen  
 Chamberlain, Joseph Perkins  
 Clarke, Hans Thacher  
 Crane, Robert Treat  
 Crocker, William  
 Damrosch, Walter Johannes
- Darrach, William  
 Darrow, Karl Kelchner  
 Davis, John William  
 Davisson, Clinton J.  
 Detwiler, Samuel Randall  
 Dewey, John  
 Dinsmoor, William Bell  
 Dobzhansky, Theodosius  
 Douglas, Lewis W.  
 DuBois, Eugene Floyd  
 Dunn, Gano  
 Dunn, Leslie Clarence  
 Fermi, Enrico  
 Flexner, Simon  
 Fosdick, Raymond Blaine  
 Gasser, Herbert Spencer  
 Gies, William J.  
 Gifford, Walter Sherman  
 Greene, Evarts B.  
 Gregory, William King  
 Hawk, Philip Bovier  
 Hayes, Carlton J. H.  
 Ives, Herbert E.  
 Jayne, Horace H. F.  
 Jessup, Philip C.  
 Jewett, Frank Baldwin  
 †Johnson, Douglas  
 Kelley, Nicholas  
 Lamont, Thomas William  
 McGregor, James Howard  
 MacInnes, Duncan A.  
 Mitchell, Wesley Clair  
 Moe, Henry Allen  
 Moore, John Bassett  
 Nicolson, Marjorie Hope  
 Osterhout, Winthrop J. V.  
 Prince, John Dyneley  
 Rabi, Isidor Isaac  
 Richter, Gisela M. A.  
 Robbins, William Jacob  
 Rockefeller, John D., Jr.  
 Rogers, Lindsay
- † Deceased.

Rous, Peyton  
 Schelling, Felix E.  
 Schuyler, Robert L.  
 Shotwell, James Thomson  
 Simpson, George Gaylord  
 Stefansson, Vilhjalmur  
 Thorndike, Edward L.  
 Thorndike, Lynn  
 Urey, Harold Clayton  
 Van Doren, Carl  
 Van Slyke, Donald Dexter  
 Wilkins, Hubert  
 Willits, Joseph Henry  
 Winlock, Herbert Eustis  
 Wissler, Clark  
 Wolman, Leo  
 Woodworth, Robert Sessions  
 Yeatman, Pope  
 Young, Owen D.  
 van Zeeland, Paul

#### NYACK

Johnson, Alvin S.

#### PALISADES

MacIver, Robert M.

#### PEARL RIVER

Duggar, Benjamin Minge

#### ROCHESTER

Mees, C. E. Kenneth  
 Murlin, John Raymond  
 Whipple, George Hoyt

#### SCHENECTADY

Coolidge, William David  
 Fox, Dixon Ryan  
 Langmuir, Irving  
 Whitney, Willis R.

#### TUXEDO PARK

Loomis, Alfred Lee

#### North Carolina

##### CHAPEL HILL

MacNider, William de B.

#### Ohio

##### DAYTON

Kettering, Charles Franklin

#### Pennsylvania

##### BRYN MAWR

Carpenter, Rhys  
 Swindler, Mary Hamilton

##### PHILADELPHIA

Bronk, Detlev W.  
 Calvert, Philip Powell  
 Cheyney, Edward Potts  
 Cret, Paul Philippe  
 Dickinson, John  
 Fels, Samuel S.  
 Gates, Thomas Sovereign  
 Goodrich, Herbert Funk  
 Haney, John Louis  
 Hayward, Nathan  
 Holland, Leicester Bodine  
 Hopkinson, Edward, Jr.  
 Huebner, Solomon Stephen  
 Jacobs, Merkel Henry  
 Jenks, John Story  
 Johnson, Emory R.  
 Kimball, Fiske  
 Kline, John Robert  
 Leeds, Morris Evans  
 Lewis, Warren Harmon  
 Lingelbach, William E.  
 Long, Esmond Ray  
 McClelland, George William  
 Metz, Charles William  
 Montgomery, James Alan  
 Moore, J. Percy  
 Morgan, Marshall S.  
 Morris, Harrison Smith  
 Morris, Lawrence J.  
 Morris, Roland S.  
 Norris, George William

- Olivier, Charles P.  
 Packard, Francis Randolph  
 Patterson, Ernest Minor  
 Pender, Harold  
 Pepper, George Wharton  
 Pepper, William  
 Quinn, Arthur Hobson  
 Repplier, Agnes  
 Rhoads, Charles James  
 Richards, Alfred Newton  
 Richards, Horace Clark  
 Rosenbach, A. S. W.  
 Rosengarten, Adolph G.  
 Scattergood, J. Henry  
 Schaeffer, J. Parsons  
 Schramm, Jacob R.  
 Scott, John Morin  
 Singer, Edgar Arthur, Jr.  
 Speiser, Ephraim Avigdor  
 Wetherill, Samuel Price  
 Witmer, Lightner  
 Young, James Thomas
- PITTSBURGH  
 Foote, Paul Darwin
- SWARTHMORE  
 Dresden, Arnold  
 Köhler, Wolfgang  
 McClung, Clarence E.  
 Miller, John Anthony  
 Swann, W. F. G.
- STATE COLLEGE  
 Whitmore, Frank Clifford
- Rhode Island  
 PROVIDENCE  
 Bryant, William L.  
 Hunter, Walter Samuel  
 Kraus, Charles August
- Tennessee  
 NASHVILLE  
 Goodpasture, Ernest William
- Texas  
 AUSTIN  
 Painter, Theophilus Shickel  
 HOUSTON  
 Lovett, Edgar Odell  
 Wilson, Harold Albert
- Vermont  
 S. SHAFTSBURY  
 Frost, Robert
- Virginia  
 BEDFORD  
 Harper, Robert A.  
 RICHMOND  
 Freeman, Douglas Southall  
 UNIVERSITY  
 Beams, Jesse Wakefield  
 Mitchell, Samuel Alfred
- Wisconsin  
 MADISON  
 Allen, Charles Elmer  
 Birge, Edward Asahel  
 Jones, Lewis Ralph  
 Leith, Charles Kenneth  
 Stebbins, Joel  
 WILLIAMS BAY  
 Struve, Otto

## FOREIGN RESIDENTS

## South America

## ARGENTINE

Amado, Alonso

## PERU

García, Godofredo

## Canada

## VICTORIA

Miller, Hunter

## Mexico

## MERIDA, YUCATAN

Morley, Sylvanus Griswold

## Denmark

## COPENHAGEN

Bohr, Niels Henrik David  
Krogh, August

## England

## CAMBRIDGE

Adrian, Edgar Douglas  
Bragg, William Lawrence  
Dirac, Paul Adrien Maurice  
Eddington, Arthur Stanley  
Hardy, Godfrey Harold  
Hopkins, Frederick Gowland

## DOWNE, KENT

Keith, Arthur

## GREENWICH PARK

Jones, Harold S.

## HARPENDEN, HERTFORDSHIRE

Fisher, Ronald Aylmer

## LONDON

Bell, Harold Idris  
Beneš, Eduard

Dale, Henry Hallett

Gardiner, Alan Henderson

Gooch, George Peabody

Hill, Archibald Vivian

Kenyon, Frederic George

Prain, David

Richardson, Owen Willans

Toynbee, Arnold Joseph

## OXFORD

Beazley, John Davidson

Craigie, William A.

## France

## PARIS

de Broglie, Louis Victor

Janet, Pierre

de Margerie, Emmanuel

Rist, Charles

## Germany

## BERLIN

Penck, Albrecht F. K.

Planck, Max

## LEIPZIG

Heisenberg, Werner

## Netherlands

## AMSTERDAM

Brouwer, Luitzen Egbertus J.

## LEIDEN

Hertzsprung, Ejnar

Kramers, Hendrik A.

## Norway

## OSLO

Hjort, Johan

## Panama

## PANAMA CITY

Méndez-Pereira, Octavio

**Scotland****EDINBURGH**

Keith, Arthur Berriedale

**ST. ANDREWS**Irvine, James Colquhoun  
Thompson, D'Arcy W.**Spain****MADRID**

Pidal, Ramón Menéndez

**Sweden****LUND**

Nilsson, Martin P.

**STOCKHOLM**

Heckscher, Eli Filip

**UPSALA**

Svedberg, Theodor

**Switzerland****GENEVA**

Rappard, William E.

**U. S. S. R.****MOSCOW**

Vinogradov, Ivan M.

## MEMBERS ELECTED APRIL 23, 1943

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### CLASS I. MATHEMATICAL AND PHYSICAL SCIENCES

#### *Resident*

Raymond Thayer Birge.....Berkeley, Calif.  
Samuel Colville Lind.....Minneapolis, Minn.  
Donald Howard Menzel.....Cambridge, Mass.  
Marshall Harvey Stone.....Cambridge, Mass.  
Merle Antony Tuve.....Chevy Chase, Md.  
Frank Clifford Whitmore.....State College, Pa.

#### *Foreign*

Sir William Lawrence Bragg.....Cambridge, England  
Luitzen Egbertus Jan Brouwer.....Amsterdam, Netherlands  
Godofredo García.....Lima, Peru

### CLASS II.—GEOLOGICAL AND BIOLOGICAL SCIENCES

#### *Resident*

Rollin Thomas Chamberlin.....Chicago, Ill.  
Ralph Works Chaney.....Berkeley, Calif.  
Hans Thacher Clarke.....New York, N. Y.  
Leslie Clarence Dunn.....Riverdale, N. Y.  
Ernest William Goodpasture.....Nashville, Tenn.  
Warren Harmon Lewis.....Philadelphia, Pa.  
George Linius Streeter.....Baltimore, Md.

### CLASS III. SOCIAL SCIENCES

#### *Resident*

Julian Parks Boyd.....Princeton, N. J.  
Douglas Southall Freeman.....Richmond, Va.  
Owen Lattimore.....Baltimore, Md.  
Henry Allen Moe.....Riverdale-on-Hudson, N. Y.  
Walter W. Stewart.....Gladstone, N. J.  
Quincy Wright.....Chicago, Ill.

## CLASS IV. HUMANITIES

*Resident*

William Ernest Hocking.....	Cambridge, Mass.
Fiske Kimball.....	Philadelphia, Pa.
Charles Grosvenor Osgood.....	Princeton, N. J.
Erwin Panofsky.....	Princeton, N. J.
Mary Hamilton Swindler.....	Bryn Mawr, Pa.
George Clapp Vaillant.....	Philadelphia, Pa.

*Foreign*

John Davidson Beazley.....	Oxford, England
Alan Henderson Gardiner.....	London, England

## COUNCIL NOMINEES

Chester Irving Barnard.....	Newark, N. J.
Henry Agard Wallace.....	Washington, D. C.

## MEMBERS DECEASED DURING 1943

	Date of election
Abbott Lawrence Lowell, January 6, aet. 86 .....	1909
George W. Crile, January 7, aet. 78 .....	1912
David Hilbert, February 14, aet. 81 .....	1932
Howard Hawks Mitchell, March 13, aet. 58 .....	1925
John C. Rolfe, March 26, aet. 83 .....	1907
William A. Setchell, April 5, aet. 79 .....	1919
Albert P. Brubaker, April 29, aet. 90 .....	1895
Arthur W. Goodspeed, June 6, aet. 82 .....	1896
William F. Magie, June 6, aet. 84 .....	1896
Hermon C. Bumpus, June 21, aet. 81 .....	1909
James Brown Scott, June 26, aet. 77 .....	1930
Karl Landsteiner, June 26, aet. 75 .....	1935
Frank Schlesinger, July 10, aet. 72 .....	1912
William F. Osgood, July 22, aet. 79 .....	1915
William Lyon Phelps, August 21, aet. 78 .....	1927
Aleš Hrdlička, September 5, aet. 74 .....	1918
Frederick Paul Keppel, September 8, aet. 68 .....	1938
Charles M. Andrews, September 10, aet. 80 .....	1924
John MacFarlane, September 16, aet. 87 .....	1892
Aurel Stein, October 26, aet. 81 .....	1939
Frank Leverett, November 15, aet. 84 .....	1924
Russell H. Chittenden, December 26, aet. 88 .....	1904
James S. deBenneville, December 31, aet. 76 .....	1897
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Frank Dawson Adams, December 26, 1942, aet. 84 .....	1916

## TABLE OF TOTALS

	Resident Members	Foreign Members
December 31, 1942 .....	467	50
Elected during 1943 .....	27	5
Deceased during 1943 .....	21	3
December 31, 1943 .....	473	52



## X

### OBITUARIES

CHARLES McLEAN ANDREWS

(1863-1943)

Dr. Charles McLean Andrews, Farman Professor Emeritus of American History at Yale University, died September 10, 1943. Dr. Andrews came of sturdy New England stock, long associated with the history of Connecticut, and one of his ancestors, William Andrews, was among the first settlers of New Haven. Born in 1863, at Wethersfield, Charles Andrews graduated from Trinity College at Hartford in 1884 with the B.A. degree, and from Johns Hopkins in 1889 with the Ph.D. degree. After teaching at Bryn Mawr and Johns Hopkins, he went to Yale in 1910, where he remained until his death. Although an able lecturer and undergraduate teacher, his influence as a graduate teacher was even stronger, and his former students today occupy chairs of history in colleges in many parts of the United States.

As an historical investigator and writer he won an international reputation. In his chosen field of American colonial history, he was one of the first to point out that little progress could be made until the mass of manuscript material in Great Britain had been catalogued and made available to American students, and his work in searching through the archives of the British Public Record Office and of the British Museum and publishing guides to them was a major contribution to American historical investigation.

But Dr. Andrews, not content with aiding other historians, was himself a voluminous and able writer. It was his monumental work, *The Colonial Period of American History*, in four volumes, which won for him the reputation of being the dean of American historians. Clearly, though not brilliantly, written, well organized, based almost entirely on the primary sources, it has been recognized as the standard work in its field.

In his scholarship Dr. Andrews was too sound to commit himself to exaggerated or over-emphasized theories of historical in-

terpretation. Frankly recognizing the great weight of economic forces, he refused to align himself with the economic determinists in minimizing or ignoring other vital factors in shaping the course of history. This sense of balance he owed in part at least to the breadth of information which gave him an historical perspective denied to many other investigators. His brilliant presidential address on "The American Revolution: an Interpretation" to the American Historical Association in 1925, would have been impossible for one with a less comprehensive grasp of all phases of the history of both England and America during the entire colonial period.

Dr. Andrews was elected a member of the American Philosophical Society in 1924.

With Dr. Andrews' death, the nation has lost one of its soundest, most prolific, ablest historical writers and one of its clearest and most beloved teachers.

THOMAS J. WERTENBAKER

### JAMES S. DE BENNEVILLE

(1867-1943)

With the death of James S. de Benneville on December 31, 1943, the American Philosophical Society has lost one of its oldest members. Though he was by nature retiring and scholarly, his life was privileged with a far greater interest and variety than is the usual lot. Forced by illness to abandon a scientific career which was approaching fruitfulness, he spent the greater part of his life as the student of a people who were and still are to many an unknown and incomprehensible segment of mankind.

He was born on April 12, 1867, of a family long established in Philadelphia, and obtained his education at the Faires Classical Institute. After obtaining his A.B. degree at Princeton in 1888, he chose the profession of chemistry, studying for several years privately under Dr. F. A. Genth. He opened his own analytical laboratory in Philadelphia, and there carried out much original work, particularly on alloys of iron with chromium, molybdenum and tungsten.

Illness forced his retirement from this profession in 1898, and he sought relief in travel. This took him to Japan, where he mar-

ried and remained for eighteen years. Equipped as he was by a strong interest in western culture and classical literature, he was able to study the Japanese from our point of view. Yet he was able to approach the people in their common life by learning the language and traveling widely over the country at a time when "tourist routes" were not the fashion.

His interest in the Japanese chronicles led him to publish four books dealing with the history and legend of the peoples *Tales of the Samurai—Oguri Hangwan Ichidaiki*; *Tales of the Wars of the Gempei—Saito Musashi-bo Benkei*; and *Tales of the Tokugawa*: (I) *Bakemono Yashiki*, (II) *Yotsuya Kwaidan*. His personal impressions of Japan are contained in another of his books, *Sakurambo* (The Fruit of the Tree), and his book *More Japonico* is an exhaustive treatment of the Japanese from a political and sociological point of view.

His whole life had become completely bound up with Japan, yet he left there in 1917 in order that his children might be raised here, in his own tradition. But this was a personal sacrifice for him. All his existence was integrated with Japan—with Japanese and the foreign colony in Japan—for two decades; in America his connections were broken. But he had much to do. For ten years or more he spent his time rearranging the work he had brought over from Japan—translations, ideas, studies.

His later years were burdened with physical affliction, particularly by the loss of most of his sight. During a period of complete blindness, he wrote several novels, one of which, *George Brandt*, was published. This was his way of rebelling at enforced idleness.

His personal life was marked with kindness to others and consideration for others far above that required for average human relationships. His interests were wide; past, present, and future were his concern and he lived much in each. He was one who could not have felt that he never had lived.

In addition to the American Philosophical Society, he was a member of the following societies: the Society of Colonial Wars, the Pennsylvania Society of Sons of the Revolution, the Loyal Legion, the Society of the Cincinnati, and the Yokohama United Club.

MARIE DE BENNEVILLE

## ALBERT PHILSON BRUBAKER

(1852-1943)

Dr. Albert Philson Brubaker, son of Henry and Emeline (Philson) Brubaker, was born August 12, 1852, at Somerset, Pennsylvania, and died in Philadelphia, April 29, 1943, at the advanced age of over 90 years. At the time of his death, he was Emeritus Professor of Physiology and Medical Jurisprudence at the Jefferson Medical College. He received his early education in the public schools and the Somerset Academy and began his medical career in the office and under the supervision of his distinguished father, who was widely known throughout western Pennsylvania as a highly successful general practitioner of medicine, possessed of "technical skill, intelligence, integrity, and a liberal supply of common sense." Dr. Brubaker always felt that he owed much to the influence and direction of his father.

Dr. Brubaker entered the Jefferson Medical College in 1872, from which institution he graduated in 1874, receiving the degree of Doctor of Medicine with honors. After his graduation he served in the medical clinics of the Jefferson Hospital, associated with Dr. James C. Wilson; the Charity Hospital; and the Orthopedic Hospital and Infirmary for Nervous Diseases. It was in the latter institution in the service of Dr. Wharton Sinkler that Dr. Brubaker became interested in the anatomy of the nervous system in its relation to physiological and pathological processes in all parts of the body. He was of the opinion that this early interest and association contributed largely to his success as a teacher in later years. In all, eight or more years were spent in these clinical connections.

It was apparent, however, that Dr. Brubaker's natural inclinations were not in the field of clinical medicine but in the field of the basic sciences of medicine, especially the science of physiology. The stimulus received from the learned and literary lectures and presentations of Professor James Aitken Meigs, then occupying the Chair of Institutes of Medicine at the Jefferson Medical College as successor to the distinguished "Father of American Physiology," Dr. Robley Dunglison, and his own natural proclivities, led Dr. Brubaker at an early time to become associated with this brilliant teacher of physiology. Unfortunately the sudden and unexpected death of Professor Meigs, in November 1879, terminated the leader-

ship of this man and the association of Brubaker with him. The passing of Meigs was keenly felt by his younger associate.

In 1878 Dr. Brubaker first came in contact with the "vigorous and practical personality" of Dr. Henry C. Chapman who came to the Jefferson Medical College in that year to teach practical physiology in the summer school. Dr. Chapman had just returned from Vienna, Paris, and London where he had studied for a number of years in the fields of anatomy and physiology. The death of Professor Meigs in the following year led to the elevation of Dr. Chapman to the Chair of Institutes of Medicine at the Jefferson Medical College. At the same time, 1879, Dr. Brubaker was appointed to the position of Demonstrator of Physiology under Chapman.

A cordial, helpful, and fruitful companionship came into being between Chapman and Brubaker, a relationship which continued until the spring of 1909 when Professor Chapman, who was an outstanding investigator and teacher, retired from the Chair of Institutes of Medicine, after a period of thirty years of meritorious service to Jefferson and the science of physiology. Dr. Brubaker was greatly influenced and profited much by the association with Chapman.

Dr. Brubaker who had become well known in the field of physiology by this time and had passed through various grades and categories as a teacher at Jefferson, including that of Demonstrator of Physiology, Lecturer in Materia Medica and Therapeutics, in 1891, pending the appointment of a successor to Professor Roberts Bartholow, and Adjunct Professor of Physiology and Hygiene, 1897-1908, was advanced to a full professorship and made head of the department of physiology with the title of Professor of Physiology and Medical Jurisprudence, which position he held from 1909 until the close of the academic session 1925-26, thus giving a continuous and devoted service in various capacities to the Jefferson Medical College for a period of more than fifty-three years. In the spring of 1926 Dr. Brubaker, having reached the age of retirement, presented his resignation to the Board of Trustees of Jefferson which at the time was accepted with expressions of regret. Despite this action the Board later prevailed upon Dr. Brubaker to continue the duties as departmental head for another year, which he consented to do, thus actually terminating his administrative and teaching duties in 1927.

Between the time of his appointment as Demonstrator of Physi-

ology in 1879 and his election as Professor of Physiology and Medical Jurisprudence in 1909 at the Jefferson Medical College, Dr. Brubaker not only performed the duties required in his several positions at Jefferson but in the same period of time occupied positions of importance in other institutions. Thus, in 1879, he accepted a lectureship in anatomy and in 1885 a professorship in physiology and general pathology in the Pennsylvania College of Dental Surgery, holding the latter position until 1907 when his duties at the Jefferson Medical College required his full time. Also in 1892, on the opening of the Drexel Institute of Science, Art, and Industry, Dr. Brubaker was invited by the distinguished president of Drexel, Dr. James MacAlister, to serve the Institute as a lecturer in the field of physiology and hygiene. This connection with Drexel was held for a period of twenty-two years.

Dr. Brubaker contributed substantially to the literature of the physiological, medical, and dental sciences. These papers were published from time to time in various scientific journals. He was also the author of a *Compend of Human Physiology* which was especially adapted for the use of medical students. This book passed through sixteen editions. More important, was his *Text-book of Human Physiology* which included a section on physiologic apparatus. This book was widely used and passed through eight editions.

Dr. Brubaker was a member of a number of scientific organizations, fraternal orders, and social groups, among which may be mentioned the American Physiological Society; the College of Physicians of Philadelphia; numerous medical and dental societies; the Academy of Natural Sciences; and the American Philosophical Society, to which he was elected in 1895 and to which he gave interested and devoted service in varied capacities over many years. He was a member of Lodge 51, F. and A. M.; the Philadelphia Society for Ethical Culture, of which he was president for many years; the Art Club; the Musical Fund Society; and the Contemporary Club. Franklin and Marshall College honored him by bestowing its honorary Master of Arts and Doctor of Laws degrees.

Dr. Brubaker was married September 27, 1883 to Edith B. Needles, daughter of Caleb H. and Anne M. Needles. The union was a happy one. Both gave full evidence of a true and abiding companionship. This they were privileged to enjoy for a period of forty-eight years. Dr. Brubaker graciously gave expression to

the thought that intelligent sympathy, deep interest, and helpful cooperation of Mrs. Brubaker contributed much to his happiness and success in life. She predeceased him. There were no children.

In addition to his attainments in the scientific field, Dr. Brubaker was keenly appreciative of good literature and music. He loved the out-of-doors and was interested in all living things. He was a friendly and kindly man, had personal charm, was always carefully dressed, and on all occasions conducted himself as becomes a man of his training and station. He gave freely of himself in the interests and promotion of others, and cheerfully responded to public and charitable calls. He gave inspiration to many generations of students who came to love and admire him. He not only taught them scientific facts but led them to higher planes of thinking and action. He was a strong and stimulating teacher, a clear expositor, always conservative, yet abreast of modern thought in his field of work.

Dr. Brubaker will be greatly missed by his many friends and colleagues. Through the records of his labors and accomplishments and the activities and conduct of the many students and others he influenced and inspired, he will continue to live.

J. PARSONS SCHAEFFER

### HERMON CAREY BUMPUS

(1862-1943)

Consideration of the character and achievements of Hermon Carey Bumpus requires a brief sketch of his hereditary background, training, and life work. He was born in Buckfield, Maine, May 5, 1862, and died in Pasadena, California, June 21, 1943. He came from a long line of New England ancestors, staunch, self-reliant, versatile men and women, handy with tools and with guns, assertive in town meeting, supporters of the Church. During his youth his father was a city missionary in Boston, the equivalent of the present-day social worker, and unordained pastor. His mother was a teacher, a woman of marked ability and vision. At home he was in the atmosphere of religion and good works. However, these home influences were qualified by the worldly sophistication of city-bred companions in the public schools.

He was graduated from Brown University in 1884, taught zoology at Olivet College, went in 1889 as Fellow to the newly founded

Clark University and was the first recipient of a degree, Ph.D., from that unique institution, then restricted to graduate work. He was recalled to Brown in 1890 to build up a new department of biology. During his ten years there, he continued his very active teaching, organizing, and administrative work in Woods Hole, at the Marine Biological Laboratory until 1895, and later at the United States Fish Commission where as Director he restored the scientific features envisioned by its founder, Spencer F. Baird. Meanwhile, he inaugurated a notable experimental program for the benefit of the marine fisheries of Rhode Island. Then came ten years at the American Museum of Natural History, where he became its first Director, three years as the first Business Manager of the University of Wisconsin, and five years as President of Tufts College. From 1924 until 1940 he was the enthusiastic organizer of the nation-wide educational program in the National Parks. Concurrently, he took a prominent part in organizing the Laboratory of Anthropology at Santa Fe and the new Museum of Science at Buffalo. His active trusteeships in institutions of education, art and science, his titles, honorary awards, citations, and degrees are listed in *Who's Who*. He was elected a member of the American Philosophical Society in 1909.

Dr. Bumpus was a boy naturalist. He had the inquiring mind. It is a family classic that as a child he repeatedly asked his father to read at family prayers about Jonah's adventure with the whale. Having long pondered the matter, he asked one day if, when Jonah was thrown up on dry land, he went in swimming to wash himself all clean again; a question prophetic of his wholesome regard for scientific exegesis. His interest in natural history was encouraged when he went to college. He was appointed an assistant in the college museum. He took all available courses in the natural sciences. In his senior year he wrote an authoritative article on the "Reptiles of the World," which was published in the encyclopedic *Standard Natural History*, edited by J. S. Kingsley. Thereafter, throughout life, his primary interest was the broad field of natural history.

His three major undertakings, in ascending order of importance, were at Brown University, at the American Museum of Natural History, and in the National Parks.

At Brown his fundamental purpose was to effect a molecular union of the traditional undergraduate teaching which he grew up with and the new ideals of scholarship and research which he found



at Clark which were derived from German universities via the Johns Hopkins. Within a decade he accomplished this with eminent success and left the department in a flourishing condition.

His second undertaking, which proved also to be of ten years' duration, was the directorship of the American Museum of Natural History. There he humanized the Museum by making its vast resources of material and scholarship available and intelligible to the people, especially to the school children. Soon after his arrival, he issued a special invitation to the children of the New York schools to visit the Museum for a nature talk on a certain day and hour. As the hour approached, he sensed that something unusual was happening in the street. He saw from the window that the approaches to the Museum were blocked with thousands of children awaiting the hour. Realizing that only a fraction of the throng could be taken care of in the lecture room, he marshalled the entire Museum force. As they entered, the children were allocated to the various exhibition halls of the vast building, and there were entertained by the curators and the scientific staff summarily pressed into service. The talks were no less instructive because impromptu. The interest of the school children so dramatically demonstrated was capitalized. As soon as possible provision was made for periodic visits to the Museum. A special department of education was set up and a fleet of trucks was acquired to carry carefully prepared museum exhibits to the schools of the city. The importance of Dr. Bumpus' influence upon the educational and scientific work of the American Museum and upon museum policies and practices in general was acknowledged throughout the country and abroad, even in the Antipodes.

His third major undertaking was the organization and development of a nation-wide educational program in the National Parks; at first under the auspices of the American Association of Museums, which he had been instrumental in organizing nearly twenty years before, and later under the United States National Parks Service. His conception of the "Trailside" Museums around which the program revolved proved to be a characteristic stroke of genius. In his conception the surroundings of the museums, not the contents, were the exhibits. The museums were the "labels"—the source of information about the works of Nature that were left *in situ* and undisturbed. As Dr. Bumpus said, "Museum objectives have thus become inverted but not upset." This idea spread

rapidly so that now there are more than two hundred such museums in National, State, and Municipal Parks with an annual attendance of many millions. The average yearly number of visitors in the National Park areas alone in 1938-42 was 17,000,000, the great majority of whom visited the museums. These cold figures attest the growing influence of this type of education. Dr. Bumpus and competent observers considered this work in the National Parks to be his most important contribution to education.

In the conduct of all of his undertakings, Dr. Bumpus was a natural leader because his active imagination and dynamic energy kept him a pace ahead of his fellows, and his enthusiasm, unselfishness, wisdom, and fairness always brought him the loyalty of his staff. He had a genuine respect for youth and an uncanny discernment of the potential capability of individual young men. He would select one of them—often to the youth's own astonishment—to head a new enterprise in preference to a readily available veteran, and then, with hands off, take utmost satisfaction in watching his development. Even for an old proposition he preferred to risk the fermentation of new life rather than to play safe with over-standardized experience. At the American Museum he selected a sculptor to reform taxidermy; a physiologist to create a great scientific library; a young zoologist, utterly innocent of pedagogy, to develop an extensive program of museum education. In every institution which he was directing, he made it his primary duty to know and to understand what each member of his organization was doing, and his knowledge and experience were so broad that he could usually be of assistance. "He could lay an idea before one of his associates with enthusiasm and fervor, transfer some of the flame that was in himself, and thereafter let the man and the job alone until he was sent for to come back to see its progress. He never hounded anybody in whom he had reason to feel confidence. He was always overjoyed, in fact, if the heaven he had set working produced a result somewhat different from the one he had envisioned." He was a past master in delegating authority and responsibility and this freed him to turn his attention to new projects which his fertile imagination was ever pressing upon him. Both in small matters and in long-time programs he acted as a catalyzer, bringing about reactions and, when the resulting organization began to run smoothly, gradually retiring from the scene, but not before he had made his complete contribution.

Dr. Bumpus possessed amply attested talents in teaching, research, and administration. He could have achieved eminent distinction in any one of these fields, but, by bringing to bear his combined talents upon one enterprise after another, the sum total of his influence upon science and education was far greater than it would have been, if he had employed them in one field only.

In Dr. Bumpus the sterling virtues and missionary spirit of his forebears were perpetuated, adapted to a vastly different environment, and leavened with just enough minor faults to make him human and lovable. His buoyant spirits, his joy in living, his great capacity for friendship, his absorption in his work, and the breadth of his interests are held in appreciative memory by all who knew him, and very many acknowledge with gratitude and affection the inspiration and orientation which they owe to his wise counsel.

ALBERT D. MEAD

### RUSSELL HENRY CHITTENDEN

(1856-1943)

Those few to whom it is given to be the creators of particular sciences deserve to have their busts and portraits placed in a Hall of Fame and their personalities preserved in words of similar honor. Among these creators was Russell Henry Chittenden; and the science which he may justly be claimed to have created is American bio-chemistry.

Born in 1856 of an old Connecticut family and educated initially in the common schools of New Haven, he entered the then recently founded Sheffield Scientific School and graduated in 1875 with the degree of Ph.B.—the new degree that had already begun to be recognized as equivalent in the field of science to the traditional B.A. in the field of classics.

What education consisted in, prior to the establishment of the Sheffield Scientific School, has been described by Chittenden himself as follows: "Education, even in the oldest and most advanced colleges, was centered mainly around classical studies and was based on an established curriculum from which no deviation was allowable. There was a deep-seated aversion to new ideas, and science, so far as it was understood, was considered to be of relatively small importance and to have little educational value. Further, this atti-

tude of indifference and distrust was strengthened by another sentiment, especially conspicuous in this country, one which for a time constituted a serious obstacle to the advancement of scientific knowledge. This was bound to a certain type of religious fanaticism, and so there arose scoffers who prophesied fearful disasters from attempts to peer into the mysteries of the universe, who even saw in the advance of science a menace to religious thought and religious belief. Studies in geology and biology were especially open to criticism and any statements bearing on the creation of the world and the evolution of man not in harmony with the biblical story must be false and tending to destroy religious faith. Hence the story of the rocks was to be discredited and biological study of man's origin was considered as fraught with moral danger. Therefore, the study of science was not to be encouraged and this sentiment did in many quarters play a part in holding back the development of science in this country."

As Chittenden's life span of nearly eighty-eight years lay between the period of the eighteen fifties and that of the nineteen forties, the background of his scientific and educational activities in the early years will be sufficiently indicated by the foregoing passage, and for his later years by certain evidence regarding American student conceptions in 1940. This evidence shows that ninety years have not yet sufficed to afford an altogether complete victory for scientific education. It is afforded by a pamphlet which lies before me entitled "The Undergraduates Guide to Courses in Yale College, 1939-1940, published by the Yale Daily News" and compiled by two of the undergraduate editors of that "oldest College Daily." After three pages of "random thoughts" they present critiques of the principal courses of study from the standpoint of that considerable element among present day undergraduate students who are under the inspiration of faculty advisors whose interests lie mainly in the "cultural" branches. In these critiques there is, so far as I can see, now no trace of religious antagonism to science. But there is a substitute in the conception that the primary advantage of a college education is "culture": the thin culture of those who, after avoiding the classics, and all but the minimum requirements in modern languages and science, major in the numerous courses in English literature denominated as the "Age of this, that and the other dramatist, novelist, essayist, or poet." As regards courses in science, such comments slip into the accounts

as that on Chemistry 33, "Memory is the prime requisite, the student being required to memorize a 49 page outline of essential equations. . . . The laboratory course is the most satisfactory aspect *if the student likes that sort of work.*" (Italics by Y. H.) But the gem of all the critiques of courses is that in regard to physiology; and this is particularly relevant here for the reason that, for many years before he ceased teaching, Chittenden himself gave a course in that subject. He had certainly left with hundreds of students through the years the conception that inside their skins they are something more material than Wordsworthian souls "trailing clouds of glory." Yet the student evaluation of the present course in physiology is as follows:

"Applied Physiology 63. This course, consisting in a detailed survey of the human body, has been widely popular" [About 400 students take it annually.] "for the wrong reasons, i.e., easy, spectacular, practical, amusing. The main contribution of the course is to help you in talking to your doctor and in avoiding quack remedies. *If that is what you want from a course at Yale by all means take it.*" (Italics by Y. H.)

Evidently obscurantism toward science is not yet dead in Yale among the students devoted to "culture," nor in their faculty confidants by whom science is still rated as a low order of intellectual activity. But evidently also in the long fight for science since the establishment of the Sheffield Scientific School, Chittenden and his colleagues have almost won.

Returning now to the late eighteen seventies we find Chittenden as a student rapidly absorbing all the chemistry available in New Haven, which was equivalent to all the chemistry existing in America at that time. Most remarkable is the fact that on graduating in 1875 at the age of nineteen, he presented a thesis in which he announced his discovery of "Glycogen and Glycocol in the Muscular Tissue of Pecten Irradians": a paper that was published both in the *American Journal of Science* and, after translation into German, also in Liebig's *Annalen der Chemie*. Even at this early age Chittenden's mind had developed the conception that life itself is chemical. At that time the physical side of physiology—the heart and circulation, respiration and muscle-nerve reactions—was making major contributions to medical knowledge. Claude Bernard in Paris and Carl Ludwig in Leipzig were winning for experimental

physiology a high place among the sciences. But few investigators anywhere in the world, and virtually none beside Chittenden in America, had grasped the conception of what, in the next twenty-five years, came to be known as physiological chemistry, and is now recognized, in its vast breadth of bearing on the processes constituting life, as bio-chemistry.

Almost immediately he began to teach in the Scientific School and in the Report of the Governing Board for 1882-83 it was announced:

"The School has been fortunate during the past year in adding to the corps of its permanent officers Russell H. Chittenden as occupant of the newly founded Chair of Physiological Chemistry. Mr. Chittenden was a graduate of the institution in the class of 1875. After graduation he remained, pursuing a course of special study in Physiological Chemistry; and on account of the proficiency he displayed in this particular subject was almost immediately made instructor in it, and had the main charge of the Laboratory of Physiological Chemistry until 1878. He then went to Germany and studied chemistry and physiology in the University of Heidelberg. Returning, he resumed charge of the Physiological Laboratory, and in 1880 received from Yale College the degree of Doctor of Philosophy. In the summer of 1882 he went to Germany by request to carry on an investigation in Physiological Chemistry with Professor Kühne of Heidelberg. During his absence he was elected to the Chair above mentioned by the Corporation of Yale College at their meeting in Commencement Week."

The time was propitious. As Chittenden tells in his *History of the Sheffield Scientific School* (Yale University Press, 1928) after years of financial difficulty the Scientific School had finally won the enthusiastic interest and strong financial support of Mr. Joseph Earl Sheffield, an outstanding capitalist and railroad builder of his time. Over a period of years, Mr. Sheffield added so largely to the invested funds of the School that it was given the name of the Sheffield Scientific School. At his death he also left to the School a building which had been his private residence and which was converted into the Laboratory of Biology and Physiological Chemistry and so remained until 1924 when it was assigned to the writer of this sketch in association with H. W. Haggard, its present director, as the Laboratory of Applied Physiology.

In his book *The Development of Physiological Chemistry in the United States*, a work of 439 pages published in 1930 as one of the American Chemical Society Monographs, Chittenden has told of his establishment of "the first definitive laboratory of physiological chemistry for the instruction of students in the Sheffield Scientific School in 1874." For twenty-five years it remained the only laboratory of its type in America. Even at Harvard it was not until 1898-99 that a man, Dr. Franz Pfaff, was appointed as Instructor in Pharmacology and Physiological Chemistry. At Harvard, however, the establishment of a laboratory of experimental physiology by Henry P. Bowditch in 1871 was an equally important contribution to the development of the experimental biological sciences in America.

By 1885 the amount of research work by graduate students in the Sheffield laboratory had reached such an amount that a volume of studies in Physiological Chemistry was issued covering the work in the college year 1884-85: the first of a long series. It is particularly noteworthy that the research students who then and for many years afterward carried on this work were, in the large majority of cases, candidates for the Ph.D. degree. The scholarship requirements of Chittenden were thus an important factor in setting the standard for the Ph.D. and in leading ultimately to that feature of higher university education everywhere to which President Daniel C. Gilman of Johns Hopkins University later referred in the words "Yale and Sheffield are entitled to the credit of introducing among American institutions the degree of Doctor of Philosophy, demanding for it a high standard of attainment and never bestowing the honor by any irregular promotion."

Of Chittenden's methods in his laboratory it may be said that the amount of experimental work done with his own hands was not very large. Like Carl Ludwig in Leipzig he worked mainly through the hands of his students. He was rather the great teacher than the great experimenter. But in such work as he did himself he maintained an extraordinary standard of neatness and precision; and he required as much as possible of these qualities in his students. His hands were small and rather pudgy; yet over the years that I was his student and assistant I recall no case in which he ever broke a piece of glassware or spilled a drop of alcohol or chemical reagent on the glittering varnish of the workbenches in his laboratory. Not so, of course, of his students: if ever one of them had

an accident or made a mess, he could count almost with certainty on the sudden appearance of the Professor at his elbow with his favorite remark "Was für eine Schweinerei."

Among his students, the majority won positions of importance in colleges and investigative institutions throughout the country or became eminent in clinical medicine or surgery. A notable number attained membership in the American Philosophical Society and the National Academy of Sciences; he was elected a member of the Academy in 1890 and of the Society in 1904. Among those men was Lafayette B. Mendel who, during the years that Chittenden was administering the entire Scientific School, directed the work of the laboratory and won for himself an eminence in bio-chemistry almost equal to that of Chittenden himself.

Chittenden's outstanding characteristic alike as scholar, teacher, and administrator, was an aggressive and obstinate determination. Once he had undertaken a certain line of investigation nothing could induce him to deviate from that line. Accordingly he missed the credit and satisfaction of himself making many of the discoveries that during his working years must have lain almost before his eyes. This characteristic was shown even more strikingly in his work as an administrator. During the years 1898-1922 he was the Director of the Sheffield Scientific School; and in his hands that position became for a time by far the most powerful of any in the University. He was indeed—as he was commonly called—"the little boss," but the way in which he bossed was not little.

Under his management the Scientific School developed in resources and increased in student numbers until by 1920 it seemed on the point of outstripping the older institution of Yale College. The Scientific School had grown up only a short quarter of a mile from the College, but largely independently. Rivalry between the two schools was intense. Each had not only its own laboratories of chemistry and physics, but also its own departments of German, French, and English. Each was, in fact, a college complete in itself—or almost so.

The College faculty had a wider diversity of pedagogical interests than the Scientific School, and its funds and faculty were controlled by the Yale Corporation. The Governing Board of the Scientific School, on the contrary, was composed of the older professors who largely controlled their own funds and could raise or



cut their own salaries. At the head of the College was a dean with little power other than that of student discipline. Above him was the President who, at that time, was a brilliant talker and writer, but as weak in all administrative matters as Director Chittenden of the Scientific School was able, precise, and determined. And to cut a long story short: for twenty years in the complicated maneuvering which went on unceasingly, but was kept completely concealed from public knowledge, Chittenden took all the tricks for the Scientific School.

Then in 1922, when Chittenden had reached the age of compulsory retirement and, as one of the many aftermaths of the world war came disaster in respect to nearly everything in productive scholarship, teaching, administration, and institutional loyalty that lay near to Chittenden's heart. The lawyers for the University—as incapable as lawyers generally are of conceiving of any form of organization other than that by which American capitalistic civilization manages its affairs—ruled that Yale University is legally on the same basis in its employer-employee relationship as any railroad, or bank, or factory. Arrangements were enforced by which some 200 students who each year had been entering the Scientific School were sent thereafter instead to the College. Only after a struggle was the name "Sheffield," as associated with scientific education at Yale, saved from the holocaust. But greatest of all sorrows and disappointments for Chittenden was the fate of biochemistry: it was removed from the Scientific School and assigned to the Medical School over on the other side of the city. It was the end for Chittenden of his lifelong hope that some day there might be in the Sheffield Scientific School a great Institute of Bio-Chemistry and Nutrition. And with that hope died also the great tradition of Chittendenian bio-chemistry at Yale.

It remains only to mention the physical characteristics of the man: his snapping brown eyes; his beetling Roman nose; his thick brown and later grey hair; and his small pointed beard. But most remarkable was his size: he was only 5 feet 2½ inches in height and when he died after a brief illness he weighed only 105 pounds. He was, in fact, diminutive; but he had a dignity and authority of manner such as no mere physical size can give. Through every millimeter he was a man.

YANDELL HENDERSON

## GEORGE WASHINGTON CRILE

(1864-1943)

George Washington Crile, eminent surgeon, died in Cleveland, Ohio, on January 7, 1943, aged 79 years. He was born in Chili, Ohio, November 11, 1864, received an A.B. degree from Ohio Northern University in 1885 and the degree of M.D. from University of Wooster Medical Department (now Western Reserve University School of Medicine) in 1887. He was Professor of Principles and Practice of Surgery, University of Wooster, 1893-1900; Professor of Clinical Surgery, Western Reserve University School of Medicine, 1900-11; Professor of Surgery, Western Reserve University School of Medicine, 1911-24. He received five honorary degrees, and he was given an honorary fellowship in eight foreign medical and surgical organizations. He was awarded numerous prizes and medals from American and foreign institutions, including the Lannelongue Medal of the Société Internationale de Chirurgie de Paris and the United States Distinguished Service Medal. He was elected a member of the American Philosophical Society in 1912.

Dr. Crile was one of the first to study the problem of surgical shock by experimental methods. Although some of his early conclusions were later shown by others to be untenable, his contributions did much to emphasize the importance of certain factors in the prevention of shock. At the time of his early investigations American surgery, under the influence of German thought and practice, was largely of a "rough and ready" sort, characterized by anesthesia which was atrocious from the modern viewpoint, a rough almost brutal handling of the tissues and but little regard for hemostasis. Crile was chiefly responsible for the introduction of nitrous oxide into surgical practice, although its anesthetic properties had been discovered many years earlier. This was one of the most important contributions to the subject of practical surgical anesthesia that had been made in forty years. He early recognized the value of local anesthesia and upon its use he based some of his much discussed principles of "anoci-association." He was a constant proponent of sharp dissection and gentle handling of tissue at the operating table. His incessant emphasis on these points simultaneously with that of Halsted counteracted the German influence of rough operating. He early recognized the importance of

hemostasis in the prevention of shock and was one of the first to foresee the practical importance of blood transfusion even before the knowledge of different blood groups had made it a feasible procedure. Likewise, he was a pioneer in emphasizing the importance of the emotional factor in surgery. His plan of "stealing" the gland in toxic thyroid cases, by which the patient was lightly anesthetized two or three times before the day of operation and thus kept in ignorance of when it was to take place, was influential in avoiding the emotional stress of worry. Before the rediscovery of the effectiveness of iodine in controlling the toxic condition of such patients his plan undoubtedly contributed much in the accomplishment of his remarkably low operative mortality in this disease. The gradual accumulation of knowledge of how to prevent surgical shock has been very largely an American contribution. In importance the solution of this problem ranks with asepsis and anesthesia. Crile's persistent emphasis on the problem and his own pioneer contributions to its solution places him as one of the most important creators of modern surgery.

The earlier surgeons had been trained largely in anatomy and gross pathology. They had but little concern with function. Crile stood on the threshold of a new era, that of what might be called physiological surgery. It was perhaps more than a coincidence that at the age of twenty-six, three years after receiving his medical degree, he was appointed Professor of Physiology at the University of Wooster, a position which he held for three years. This early interest in physiology was maintained throughout his career. Among his very numerous published papers and books there is almost nothing of the sort which distinguished the preceding leaders of surgery, practically no studies in the fields of human anatomy or pathology. The study of function, normal or pathological, was a consuming passion throughout his life. He was interested in the activities of a single cell, of an organ, of a human being and even of masses of human beings collected together into what is known as society.

His restless inquisitive mind, coupled with a remarkable energy, sometimes led him astray into fields which he was not adequately prepared to enter. But criticism never evoked any bitterness from him. Even his closest associates never saw any display of anger or heard him utter any derogatory remarks about anybody. He had a sharp appreciation of humor, but seldom related a humorous

incident. Even his casual conversation revealed that his mind was constantly creative, that he was always thinking of newer and better ways in which to treat sick patients and sick society. It was perhaps natural that so dynamic a personality as Crile should develop a never failing interest in the question of the mechanism of the transmission and expenditure of energy in the living animal. This interest led to an extensive comparative anatomical study of the sympathetic nervous system, the endocrine glands, the brain, the heart and blood volume of nearly 4000 animals representing almost all the known species of the arctic, the temperate and the equatorial zones. As a part of this inquiry, he and Mrs. Crile made extensive trips to various regions of the earth which permitted Dr. Crile to obtain and to dissect fresh material on the spot. Much of this material is now on display in the Museum of the American College of Surgeons at Chicago. The conclusions drawn from this study, which was published in 1941 in his book, *Intelligence, Power and Personality in Man and Animals*, were that the qualities named in the title of the book seem to be dependent on the absolute and relative sizes of the various organs mentioned. Thus the carnivorous animals, dependent upon their agility in catching their food, have much larger adrenal and thyroid glands and much more highly developed sympathetic nervous systems than the herbivorous animals.

Dr. Crile was regarded by all his colleagues as a master surgeon. His operating was brilliant and rapid, and he made numerous technical contributions to his art. One of his major interests was the improvement of the type of surgery to which the average person was exposed. He was one of the original group of twelve which founded the American College of Surgeons in 1912 for that purpose. He served as its president in 1916 and 1917, and he was the chairman of the Board of Regents continuously from 1913 to October 1939, when he requested that he be not considered as a candidate for re-election. Much of what the College has accomplished has been due to his unfailing and tireless interest in its welfare and the enormous expenditure of time and energy which he devoted to it.

In both the Spanish-American War and in World War I he volunteered his services. In 1915 he proposed the unit organization of American base hospitals which was adopted and continued in this war. The Lakeside Hospital Unit which he organized was the first to go overseas with our Army in 1917. He served not only as

professional director of that unit, but subsequently as senior consultant in surgical research in France with the grade at first of lieutenant colonel and in November 1918, of colonel. In 1921 he was made brigadier general in the Medical Officers' Reserve Corps.

In 1921 he became one of the co-founders of the internationally known Cleveland Clinic Foundation and Hospital, to which he devoted most of his energy after resigning from his professorship of surgery. In spite of a disastrous fire only a few years after its establishment, this institution has become one of the outstanding private clinics of the world.

EVARTS A. GRAHAM

### ARTHUR WILLIS GOODSPEED<sup>1</sup>

(1860-1943)

The American Philosophical Society lost one of its most faithful members in the death of its former Secretary, Arthur Willis Goodspeed, on June 6, 1943. From the time of his election until his death his interest in the Society was constant and unflinching.

Those of us who attended its monthly meetings in the old days will recall the gracious formality with which he presented to the President the many newly elected members. He was seldom absent from the Secretary's table. Indeed, on one occasion, on a very inclement winter night, he was the only member present except the announced speaker of the evening.

Elected to membership in 1896, he was chosen one of the Secretaries of the Society in 1901, was yearly reelected, and upon the death of Dr. I. Minis Hays in 1925 became Senior Secretary. In that responsible position he served with fidelity and efficiency for ten years. In 1935 he resigned to become Editor of the Society's publications—a service which he continued to render until a year before his death.

Arthur W. Goodspeed was born on August 8, 1860, in the town of Hopkinton, New Hampshire, at the summer home of his parents. His father, Obed Goodspeed, a native of Boston, was descended from Roger Goodspeed, one of the founders of Barnstable, Massachusetts. His mother, Helen Bruce Morse Goodspeed, was of the same family as the inventor Samuel F. B. Morse, and it is not improbable that

<sup>1</sup> Expansion of an article in *Science* 98: 125 (1943). See also an appreciation by the writer in *Amer. Jour. Physics* 11: 342 (1943).

through her he inherited his aptitude for the physical sciences which he early displayed. One of the prized possessions which he would proudly exhibit in later years was a pair of telephones that when a boy he had constructed and installed between his home and that of a neighbor, this at a time when the telephone was a new and little known invention.

His early schooling was obtained in Boston, where he graduated from the Boston Latin School in 1880, being awarded its Franklin Medal. From this school he entered Harvard College. Here he came under the influence of John Trowbridge and Benjamin Peirce, who encouraged him to pursue the study of the physical sciences in which he had previously shown much interest. In 1884 he graduated from Harvard, *summa cum laude*, with highest honors in physics. During the latter years of his college course he was Tutor in Physics and Mathematics at a private school in Boston.

Immediately after graduation he was offered a position as Assistant in Physics at the University of Pennsylvania. As an opportunity for advanced study was thus provided he accepted the offer, and this decision determined the scene of his life work. He enrolled in the newly established Graduate School of the University and in 1889 received the degree of Ph.D., being incidentally the first recipient of a degree from that school.

At this time the Chair of Physics was held by George Frederick Barker, a scientist of wide and versatile experience, of international reputation, and noted as a most brilliant lecturer. He continued under Barker through the grades of Instructor and Assistant Professor, succeeding him when he retired in 1900 and continuing as Director of the Laboratory until he himself reached the age limit in 1931. Thus his teaching service of nearly half a century was wholly spent at this one institution.

There can be little doubt that Goodspeed's apprenticeship and association with Barker proved an invaluable experience and that from it he drew an inspiration to carry on in his own lectures the methods of his predecessor. Throughout his career he would take much trouble—and pleasure—in illustrating new developments in physics by interesting and ingenious demonstrations.

The period of his service was one of rapid growth of the University and of the Department of Physics. At the time of his appointment the staff in physics consisted of a single professor and his assistant. Goodspeed saw in his time its numbers and its ac-

tivities increase tenfold. Much of the success of the many adjustments made necessary by this expansion was due to the administrative skill, ready decision and quiet tact which he exhibited.

The year in which Goodspeed came to Philadelphia witnessed the famous investigations of Eadweard Muybridge on animal locomotion. This work, which paved the way for the modern motion pictures, was sponsored by the University and carried out on its campus. Goodspeed's introduction to research was as assistant at these experiments, and there can be little doubt that his great interest in the scientific aspects of photography, retained throughout his life, was stimulated, if not originated, by this experience.

Goodspeed's first independent investigation was a determination of the intensity of gravity in Philadelphia—probably the first precision measurement at that place but since superseded by more exact determinations. For some years he worked with W. N. Jennings and others in photographing various aspects of the electric discharge.<sup>1</sup> A little later we find him engaged with Edgar Fahs Smith in a determination of the specific heat of tungsten.

When the reports of Röntgen's discovery reached America early in 1896 practically every physicist whose laboratory happened to possess a Crookes tube set to work repeating and extending his experiments. Naturally Goodspeed, because of his interest and experience in photography, was one of the first to enter the field. He early realized the potential practical value of the agent. At a meeting of the American Philosophical Society on February 21, 1896, he suggested and demonstrated the possibility of detecting hidden flaws in metals by means of the new rays.<sup>2</sup> This was probably the first public suggestion of a procedure which has since developed into an application of prime importance. •

But his chief interest was directed to the medical applications of the rays. For some years his attention was focussed chiefly on the development and improvement of photographic or (using the name which he himself suggested<sup>3</sup>) *radiographic* records of the

<sup>1</sup> It was during these investigations that Goodspeed obtained an accidental effect (shadows of coins on a photographic plate) which was undoubtedly an x-ray picture produced nearly six years before Röntgen's discovery. Though the effect was not understood at the time, Goodspeed later recognized its true interpretation. Of course he never claimed any credit for what he termed an interesting accident. See Proc. Amer. Philos. Soc. 35: 17 (1896) and Science 3: 395 (1896).

<sup>2</sup> Proc. Amer. Philos. Soc. *loc. cit.*

<sup>3</sup> In Medical News 68: 169 (February 15, 1896).

bony structure of the body, in particular malformations, diseased conditions and fractures. In these investigations he was associated with many prominent physicians of the city, among them H. W. Cattell, T. G. Morton, J. Wm. White, and W. W. Keen.

In connection with this work he made careful studies of the optimum working conditions of the induction coil. He also collaborated with John Carbutt in producing the first photographic plate especially designed for x-ray work, by which the time of exposure was materially reduced. The technique which he developed from these studies enabled him early to obtain radiographs even of the thorax and abdomen of such excellence as to elicit the admiring comment of Dr. Keen:<sup>1</sup> "I certainly congratulate Dr. Goodspeed on his remarkable skill and success in this new department which in these particular cases I think surpasses any results of European or other American experimenters."

Investigations on the physical and therapeutic effects of the rays were carried on at the same time. In 1903 a study of the secondary x-radiation was presented before the American Philosophical Society. His work in the field of radiology was recognized by his election in 1902 as President of the American Röntgen Ray Society.

Although he continued to follow closely the later developments of the subject and never wholly discontinued his experiments, his appointment in 1904 as Director of the new Randal Morgan Laboratory of Physics brought a check to his investigations. His administrative duties and responsibilities in guiding the activities of the enlarged department made greater demands on his time as the years progressed. He also acted for many years as chairman of the important faculty committees on athletics and on non-athletic activities. He was an active member of the Franklin Institute of Pennsylvania, one of its Board of Managers from 1925 to 1937. His long services to the American Philosophical Society have already been mentioned. Besides publishing numerous papers he edited in 1907 a revision of Gage's *Principles of Physics* and in the same year was collaborator with A. W. Duff and others in the publication of *A Text-book of Physics*.

Goodspeed was married in 1896 to Annie H. Bailey of Hyde Park, Massachusetts, who died in 1910. Their children were Frederick Long, who lost his life in a parachute accident in 1928, Willis Bailey and Helen Gertrude (Mrs. John R. Skeen). In 1913 he

<sup>1</sup> Int. Med. Mag. 5: 319 (June 1896).



married Ethel Warren Mitchell of Staunton, Virginia. Their son, Arthur Willis, is at present First Lieutenant in the United States Army.

Though his professional life was passed in Philadelphia, Goodspeed always retained his interest in his New England home. He was a member of the New Hampshire Historical Society and for many years President of the New Hampshire Antiquarian Society. He usually spent his summers at Hopkinton and took part in many of its civic activities. And when his work was finished he returned to his native town to enjoy quietly the close of his life which was to be so soon terminated.

HORACE C. RICHARDS

### DAVID HILBERT

(1862–1943)

At the beginning of this year, February 14, died in Göttingen, Germany, David Hilbert, upon whom the world looked during the last decades as the greatest of the living mathematicians. At the age of eighty-one he succumbed to a compound fracture of the thigh brought about by a domestic accident.

Hilbert was born on January 23, 1862, at the city of Königsberg in East Prussia. He descended from a family which had long been settled there and had brought forth a series of physicians and judges. During his entire life he preserved uncorrupted the Baltic accent of his home. For a long time Hilbert remained faithfully attached to the town of his forbears, and it was well deserved that in his late years it bestowed its honorary citizenship upon him. It was the University of Königsberg at which he studied, where in 1884 he received his doctor's degree, and where in 1886 he was admitted as Privatdozent; there, moreover, he was appointed Ausserordentlicher Professor, in 1892, succeeding his teacher and friend Adolf Hurwitz, and in the following year advanced to a full professorship. The continuity of this Königsberg period was interrupted only by a semester's studies at Erlangen, and by a scholar's journey undertaken during the year before his habilitation, which brought him to Felix Klein at Leipzig and to Paris where he was attracted mainly to Ch. Hermite. It was on Klein's initiative that Hilbert was called to Göttingen in 1895; there he remained until the end of his life. He was retired in the year 1930.

In 1932 he was elected to foreign membership in the American Philosophical Society.

Beginning in his student years at Königsberg a close friendship tied him to Hermann Minkowski, his junior by two years, and it was with deep satisfaction that in 1902 he succeeded in drawing Minkowski also to Göttingen. Only too early did the close collaboration of the two friends find its end with Minkowski's death in 1909. Hilbert and Minkowski were the real heroes of the great and brilliant period which mathematics experienced during the first decade of this century in Göttingen, unforgettable to those who lived through it. Klein ruled over it like a distant god, "divus Felix," from above the clouds; his high time of mathematical productivity lay behind him. Among the authors of the great number of valuable dissertations which in these fruitful years were written under Hilbert's guidance we find many Anglo-Saxon names, names of men who subsequently have played a considerable role in the development of American mathematics. The physical set-up within which this unbridled scientific life unfolded was quite modest. Not until many years after the first world war, after Felix Klein had gone and Richard Courant had succeeded him, towards the end of the sadly brief period of the German Republic, did Klein's dream of the Mathematical Institute at Göttingen come true. But soon the Nazi storm broke and those who had laid the plans and who taught there besides Hilbert were scattered over the earth, and the years after 1933 became for Hilbert years of ever deepening tragic loneliness.

Hilbert was of slight build. Above the small lower face with its goatee there rose the dome of a powerful, in later years bald, skull. He was physically agile, a tireless walker, a good skater, and a passionate gardener. Until 1925 he was of firm health. Then he fell ill of pernicious anemia. Yet this illness only temporarily paralyzed his restless activity in teaching and research. He was among the first with whom the liver treatment, inaugurated by G. R. Minot at Harvard, proved successful; undoubtedly it saved Hilbert's life at that time.

Hilbert's research left an indelible imprint on practically all branches of mathematical science. Yet in rather strictly separated successive periods he gave himself over with impassioned exclusiveness to but a single subject at a time. Perhaps his deepest investigations are those on the theory of number fields. His monumental

report on the "Theorie der algebraischen Zahlkörper," which he submitted to the Deutsche Mathematiker-Vereinigung, is dated as of the year 1897, and as far as I know Hilbert did not publish another paper in this field after 1899. The methodical unity of mathematics was for him a matter of belief and experience. It appeared to him essential that—in the face of the manifold interrelations and for the sake of the fertility of research—the productive mathematician should make himself at home in all fields. I quote his own words: "The question is forced upon us whether mathematics is once to face what other sciences have long ago experienced, namely to fall apart into subdivisions whose representatives are hardly able to understand each other and whose connections for this reason will become ever looser. I neither believe nor wish this to happen; the science of mathematics as I see it is an indivisible whole, an organism whose ability to survive rests on the connection between its parts." Also theoretical physics was drawn by Hilbert into the domain of his research; during a whole decade beginning in 1912 it stood at the center of his interest. Great, fruitful problems appear to him as the life nerve of mathematics. "Just as every human enterprise prosecutes final aims," says he, "so mathematical research needs problems. Their solution steals the force of the investigator." Famous is Hilbert's lecture at the International Congress of Mathematicians at Paris in 1900 where he tries to feel out the immediate future of mathematics by posing twenty-three unsolved problems; they have indeed, as we can state today in retrospect, played an eminent role in the development of mathematics during the subsequent forty-three years.\* A characteristic feature of Hilbert's method is a peculiarly direct attack on problems, unfettered by any algorithms; he always goes back to the questions in their original simplicity. When it is a matter of transferring the theory of linear equations from a finite to an infinite number of unknowns he begins by getting rid of the calculatory tool of determinants. A truly great example of far reaching significance is his mastery of Dirichlet's principle which, originally springing from mathematical physics, provided Riemann with the foundation of his theory of algebraic functions and Abelian integrals, but which subsequently had fallen a victim of Weierstrass's pitiless criticism. Hilbert salvaged it in its entirety. The whole finely wrought apparatus of Calculus of Variations was here consciously set aside. We only need to mention the names R.

Courant and M. Morse to indicate what role this direct method of Calculus of Variations was destined to play in recent times. It seems to me that with Hilbert the mastering of single concrete problems and the forming of general abstract concepts are balanced in a particularly fortunate manner. He came out of a time in which the algorithm had played a more extensive part, and therefore he stressed rather strongly a conceptual procedure; but in the meantime our advance in this direction has been so uninhibited and with so little concern for a growth of the problematics in depth that many of us have begun to fear for the mathematical substance. In Hilbert simplicity and rigor go hand in hand. The growing demand for rigor, imposed by the critical reflections of the nineteenth century upon those parts of mathematics which operate in the continuum, was felt by most investigators as a heavy yoke that made their steps dragging and awkward. Full of longing and with bad conscience they gazed back upon Euler's era of happy-go-lucky analysis. With Hilbert rigor figures no longer as enemy, but as promoter of simplicity. Yet the secret of Hilbert's creative force is not plumbed by any of these remarks. A further element of it, I feel, was his sensitivity in registering hints which revealed to him general relations while solving special problems. This is most magnificently exemplified by the way along which, during his number-theoretical period, he was led to the enunciation of his general theorems on class fields and the general law of reciprocity.

In a few words we shall now recall Hilbert's most important achievements. In the years 1888-92 he proved the fundamental finiteness theorems of the *theory of invariants* for the full projective group. His method, though yielding a proof for the existence of a finite basis for the invariants, does not enable one actually to construct it in a concrete individual case. Hence the exclamation by the great algorithmician P. Gordan, at the appearance of Hilbert's paper: "This is not mathematics; this is theology!" It reveals an antithesis which reaches down to the very roots of mathematics. Hilbert, however, in further penetrating investigations, furnished the means for a finite execution of the construction.

His papers on the theory of invariants had the unexpected effect of withering, as it were overnight, a discipline which so far had stood in full bloom. Its central problems he had finished once and for all. Entirely different was his effect on the *theory of number fields*, which he took up in the years 1892-98. It is a great pleasure

to watch how, step by step in a succession of papers ascending from the special to the general, the adequate concepts and methods are evolved and the essential connections come to light. These papers proved of extraordinary fertility for the future. On the purely number-theoretical side I mention the names of Furtwängler, Takagi, Artin, Hasse, Chevalley, and on the number-and-function theoretical one, those of Fuëter and Hecke.

During the subsequent period, 1898–1902, the *foundations of geometry* are nearest to Hilbert's heart, and he is seized by the idea of axiomatics. The soil was well prepared, especially by the Italian school of geometers. Yet it was as if over a landscape, wherein but a few men with a superb sense of orientation had found their way in murky twilight, the sun had risen all at once. Clear and clean-cut we find stated the axiomatic conception according to which geometry is a hypothetical deductive system; it depends on the "implicit definitions" of the concepts of spatial objects and relations which the axioms contain, and not on a description of their intuitive content. A complete and natural system of geometric axioms is set up. They are required to satisfy the logical demands of consistency, independence, and completeness, and by means of quite a few peculiar geometries, constructed *ad hoc*, the proof of independence is furnished in detail. The general ideas appear to us today almost banal, but in these examples Hilbert unfolds his typical wealth of invention. While in this fashion the geometric concepts become formalized, the logical ones function as before in their intuitive significance. The further step where logic too succumbs to formalization, thus giving rise to a purely symbolic mathematics—a step upon which Hilbert already pondered at this epoch, as a paper read to the International Congress of 1904 proves, and which is inevitable for the ultimate justification of the role played by the infinite in mathematics—was systematically followed up by Hilbert during the final years of his mathematical productivity, from 1922 on. In contrast to L. E. J. Brouwer's intuitionism, which finds itself forced to abandon major parts of historical mathematics as untenable, Hilbert attempts to save the holdings of mathematics in their entirety by proving its formalism free of contradiction. Admittedly the question of truth is thus shifted into the question of consistency. To a limited extent the latter has been established by Hilbert himself in collaboration with P. Bernays, by J. von Neumann, and G. Gentzen. In recent times, however, the

entire enterprise has become questionable on account of K. Gödel's surprising discoveries. While Brouwer has made clear to us to what extent the intuitively certain falls short of the mathematically provable, Gödel shows conversely to what extent the intuitively certain goes beyond what (in an arbitrary but fixed formalism) is capable of mathematical proof. The question for the ultimate foundations and the ultimate meaning of mathematics remains open; we do not know in which direction it will find its final solution nor even whether a final objective answer can be expected at all. "Mathematizing" may well be a creative activity of man, like language or music, of primary originality, whose historical decisions defy complete objective rationalization.

A chance occasion, a lecture in 1901 by the Swedish mathematician, E. Holmgren, in Hilbert's seminar dealing with the, then but recently published, now classical paper of Fredholm's on *integral equations*, provided the impulse which started Hilbert on his investigations on this subject that absorbed his attention until 1912. Fredholm had limited himself to setting up the analogue of the theory of linear equations, while Hilbert recognizes that the analogue of the transformation onto principal axes of quadratic forms yields the theory of the eigenvalues and eigenfunctions for the vibration problems of physics. He develops the parallel between integral equations and sum equations in infinitely many unknowns, and subsequently proceeds to push ahead from the spectral theory of "completely continuous" to the much more general one of "bounded" quadratic forms. Today these things present themselves to us in the framework of a general theory of Hilbert space. Astonishing indeed is the variety of interesting applications which integral equations find in the most diverse branches of mathematics and physics. I mention Hilbert's own solution of Riemann's problem of monodromy for linear differential equations, a far reaching generalization of the existence theorem for algebraic functions on a preassigned Riemann surface, and his treatment of the kinetic theory of gases, also the completeness theorem for the representations of a continuous compact group, and finally in recent times the construction of harmonic integrals on an arbitrary Riemannian manifold, successfully accomplished by the use of Hilbertian means. Thus only under Hilbert's hands did the full fertility of Fredholm's great idea unfold. But it was also due to his influence that the theory of integral equations became a world-wide fad in mathe-

matics for a considerable length of time, producing an enormous literature for the most part of rather ephemeral value. It was not merit but a favor of fortune when, beginning in 1923 (Heisenberg, Schrödinger) the spectral theory in Hilbert space was discovered to be the adequate mathematical instrument of quantum physics. This later impulse led to a re-examination of the entire complex of problems with refined means (J. von Neumann, M. Stone, and others).

The integral equations are followed by Hilbert's physical period. Significant though it was for Hilbert's rounded personality as a scientist, it produced a lesser harvest than the purely mathematical ones, and may here be passed over. I shall mention instead two single, somewhat isolated, accomplishments that were to have a great effect: his vindication of Dirichlet's principle; and his proof of a famous century-old conjecture of Waring's, carrying the statement that every integer can be written as a sum of four squares over from squares to arbitrary powers. The physical period is finally succeeded by the last one, already mentioned above, in the course of which Hilbert gives an entirely new turn to the question concerning the foundation and the truth content of mathematics itself. A fruit of Hilbert's pedagogical activity during this period is the charming book by him and Cohn-Vossen, *Anschauliche Geometrie*.

This summary, though far from being complete, may suffice to indicate the universality and depth of Hilbert's mathematical work. He has impressed the seal of his spirit upon a whole era of mathematics. And yet I do not believe that his research work alone accounts for the brilliance that radiated from him, nor for his tremendous influence. Gauss and Riemann, to mention two other Göttingers, were greater mathematicians than Hilbert, and yet their immediate effect upon their contemporaries was undoubtedly smaller. Part of this is certainly due to the changing conditions of time, but the character of the men is probably more decisive. Hilbert's was a nature filled with the zest of living, seeking the intercourse of other people, and delighting in the exchange of scientific ideas. He had his own free manner of learning and teaching. His comprehensive mathematical knowledge he acquired not so much from lectures as in conversations with Minkowski and Hurwitz. "On innumerable walks, at times undertaken day by day," he tells in his obituary on Hurwitz, "we browsed in the course of

eight years through every corner of mathematical science." And as he had learned from Hurwitz, so he taught in later years his own pupils—on far flung walks through the woods surrounding Göttingen or, on rainy days, as peripatetics, in his covered garden walk. His optimism, his spiritual passion, and his unshakable faith in the value of science were irresistibly contagious. He says: "The conviction of the solvability of each and every mathematical problem spurs us on during our work; we hear within ourselves the steady call: there is the problem; search for the solution. You can find it by sheer thinking, for in mathematics there is no *ignorabimus*." His enthusiasm did get along with criticism, but not with scepticism. The snobbish attitude of pretended indifference, of "merely fooling around with things" or even of playful cynicism, did not exist in his circle. Hilbert was enormously industrious; he liked to quote Lichtenberg's saying: "Genius is industry." Yet for all this there was light and laughter around him. Under the influence of his dominating power of suggestion one readily considered important whatever he did; his vision and experience inspired confidence in the fruitfulness of the hints he dropped. It is moreover decisive that he was not merely a scientist but a scientific personality, and therefore capable not only of teaching the technique of his science but also of being a spiritual leader. Although not committing himself to one of the established epistemological or metaphysical doctrines, he was a philosopher in that he was concerned with the life of the idea as it realizes itself among men and as an indivisible whole; he had the force to evoke it, he felt responsible for it in his own sphere, and measured his individual scientific efforts against it. Last, not least, also the environment helped. A university such as Göttingen, in the halcyon days before 1914, was particularly favorable for the development of a living scientific school. Once a band of disciples had gathered around Hilbert, intent upon research and little worried by the chore of teaching, it was but natural that in joint competitive aspiration of related aims each should stimulate the other; there was no need that everything come from the master.

His homeland and America were those among all countries to feel Hilbert's impact most thoroughly. His influence upon American mathematics was not restricted to his immediate pupils. Thus, for instance, the Hilbert of the foundations of geometry had a pro-



found effect on E. H. Moore and O. Veblen; the Hilbert of integral equations on George D. Birkhoff.

A picture of Hilbert's personality should also touch upon his attitude regarding the great powers in the lives of men: social and political organization, art, religion, morals and manners, family, friendship, love. Suffice it to say here that he was singularly free from all national and racial prejudices, that in all questions, political, social, or spiritual, he stood forever on the side of freedom, frequently in isolated opposition against the compact majority of his environment. Unforgotten by all those present remains the unanimous and prolonged applause which greeted him in 1928 at Bologna, the first International Congress of Mathematicians at which, following a lengthy struggle, the Germans were once more admitted. It was a telling expression of veneration for the great mathematician whom everyone knew to have risen from a severe illness, but at the same time an expression of respect for the independent attitude, "au dessus de la mêlée," from which he had not wavered during the world conflict. With veneration, gratitude, and love his memory will be preserved beyond the gates of death by many a mathematician in this country and abroad.

HERMANN WEYL

### ALEŠ HRDLIČKA

(1869-1943)

Aleš Hrdlička was born in Bohemia at Humpolec, March 29, 1869. At the age of thirteen years he came to New York City with his parents. He was prepared for a career in medicine, graduating first from the Eclectic Medical College and later (1894) from the New York Homeopathic Medical College. His first professional appointment was to the staff of the State Hospital for the Insane at Middletown, New York. Later he was on the staff of the Pathological Institute of New York State Hospitals. During the interval 1894-96 he seems to have spent some time in medical studies in Paris. It is possible that his anthropological interest was crystallized in Paris because he gives his title at the Institute for State Hospitals as "anthropologist." In any case he began at once to amplify the anthropometric records of inmates in New York State Hospitals in 1896, especially children. His first publication on the subject appeared in 1898, followed in 1899 by an eighty-six page

booklet on *Anthropological Investigations on One Thousand White and Colored Children* in New York juvenile institutions. A perusal of this publication reveals the pattern of Hrdlička's future work, a comprehensive scheme of body measurement, particularly the head, examination of the mouth and teeth, strength tests, external morphology of the body, condition of the lungs, heart, etc. He searched for abnormalities of the ears, teeth, toes, hair, etc. He attempts to compare the frequencies of abnormalities with various classifications of his subjects according to age, ancestry, economic status, number and types of abnormalities, types of behavior, etc. In the end he shows intense enthusiasm for the collection of such data. Through it all he is concerned with the accuracy and need for better methods of measurement. This study was a pioneer major attack upon the comparative study of negroes and whites.

During this period in Hrdlička's young life, F. W. Putnam of the American Museum of Natural History was projecting a series of anthropological explorations in many parts of the world and reaching out for virile scholarly young men to participate. Hrdlička seems to have been attracted to the Museum because of the new skeletal remains arriving as part of the stream of collections reaching that institution. In 1898 Putnam was outfitting Lumholtz for a return trip to continue his study of the living Indian tribes in Mexico and gave the young Hrdlička a chance to join the expedition as anthropologist. No doubt Putnam envisaged a career for a physical anthropologist since from then until 1903 we find Hrdlička definitely associated with American Museum Expeditions to Mexico and the United States Southwest. In rapid succession he produced technical papers on his field observations, as in 1899 an exhaustive study of an ancient anomalous skeleton from the Valley of Mexico. At about the same time he studied some Chimpanzee skeletons in the American Museum and published in 1900 an exhaustive anatomical study of the parietal bone in the same.

Even as early as 1898 Putnam requested Hrdlička to examine and report on the antiquity of certain human bones found near Trenton. In his published paper Hrdlička vigorously attacked all arguments offered in support of their antiquity and from that time to the end of his life strenuously combated all archeological finds in the New World for which antiquity was claimed. Putnam believed that eventually the remains of New World Man would be found associated with the bones of extinct mammals; Hrdlička at once

aligned himself with William H. Holmes of the National Museum opposing the idea that Paleolithic man would be found in the New World. He seemed skeptical to the last that the finds of Howard, Roberts, Bird, and others were positive examples of association of human remains with those of extinct fauna.

Hrdlička was an indefatigable collector of Museum materials. He made several collecting excursions to Mexico between 1898 and 1903. He was then invited to join the anthropological staff of the National Museum, an invitation he accepted joyfully. His position at the American Museum had been largely that of a volunteer, he making his living by private medical practice. So this call to the National Museum gave him an opportunity to devote his life to the advancement of physical anthropology.

After 1903 he made many expeditions to parts of the Old World and the New, to Europe, Africa, Asia, and Australia. Wherever remains of ancient man were discovered he visited the sites and studied the specimens, appearing promptly before Scientific Societies with interesting and full reports. No other American anthropologist can claim so great personal contact with all the important world areas. He was a great traveller. Thus, during his long connection with the National Museum he accumulated one of the world's great collections of human skeletons. His admirable devotion to research eventually established his status as one of the world's outstanding authorities and his industry is shown in an unusually long bibliography. He was almost fanatical in his efforts to advance physical anthropology insisting that the essential qualification for the profession was an initial degree in a medical school.

His genius in qualitative comparative anatomy was the despair of his colleagues. His standards of measurements were so high that he was dubious of measurements made by others, preferring to do them over whenever possible. He often insisted that the personal equation in physical measurements was so great that comparative research had best be based upon the investigator's own measurements. On the other hand he was not mathematically minded and hesitated to apply the biometric methods used by other investigators probably because he had little faith in their applicability. In the end he preferred to trust his own genius in qualitative comparisons.

He founded the American Association of Physical Anthropol-

gists and the special journal devoted to that subject, for many years financing it out of his slender resources, so that this periodical should stand as his chief objective memorial—*The American Journal of Physical Anthropology*. Thus for a long time he made a lone fight to place physical anthropology in universities and medical schools and it is not too much to say that in large measure the present prestige of this branch of scholarship is the result of these efforts and his scientific acumen.

He received unusual recognition by foreign institutions in the form of honorary memberships including the receipt of the Huxley Memorial Medal, Royal Anthropological Institute of Great Britain and Ireland. His membership in the American Philosophical Society dates from 1918 and in the National Academy of Sciences from 1921. He was a faithful attendant at the meetings of the American Philosophical Society rarely failing to present a paper and to participate in the discussion of all papers touching upon phases of his special field. Barring certain questions of classification, Hrdlička was the seventh anthropologist to be elected to the National Academy of Sciences; his predecessors being Morgan, Powell, Putnam, Boas, Holmes, and Fewkes.

CLARK WISSLER

### FREDERICK PAUL KEPPEL

(1875–1943)

The death of Frederick Paul Keppel in New York on September 8, 1943, removed from American life a unique and important figure. He was a native New Yorker, son of an art dealer and connoisseur, a graduate of Columbia College (1898), which he served later as dean (1910–18) and to which he was openly devoted throughout his life. He was an outstanding example of a liberally educated man for whom the learning process was never ended.

Mr. Keppel was endowed by nature and inheritance with qualities conducive to a full and interesting life. He filled his allotted term of years with a career characterized by extraordinary vitality and enthusiasm. Early devoting himself to the promotion of knowledge, he applied an active mind, constantly broadened by study, observation, travel, and experience, to an unending inquiry into the agencies, purposes, methods, and results of education. His

election to the presidency of Carnegie Corporation of New York, in 1922, gave him an opportunity to use his talents to the utmost.

His interests were limited to no geographical region; he was widely known throughout the English-speaking world. Possessed of tremendous physical vitality and mental alertness, quick to recognize first-rate ideas and always searching for the best, he brought to the field of organized giving a freshness and directness that was often startling and never inappropriate. His imagination, social consciousness, and administrative skill set a pattern for both the past and the future course of Carnegie Corporation and the agencies connected with it. He retired in 1941.

During his retirement, he took great satisfaction in returning to public service in Washington, where he had served during World War I as Third Assistant Secretary of War under Newton D. Baker, to serve as a member of the War Relief Control Board and, also, in the State Department as a member of the Board of Appeals on Visa Cases. It is an interesting coincidence that his long career as president of the Corporation was thus followed, as it had been preceded, by a period of distinguished service to his country.

Directly through association in many organizations with which he was connected, or indirectly by advice, writing and example, he gave aim and direction to the lives of countless young men and women. He concerned himself with providing opportunities for the development and encouragement of those manners, arts, and skills which enable man to give expression to things of the spirit and to create forms through which the dignity and worth of human life are enhanced. He was a skillful guardian and administrator of philanthropic funds, a faithful servant of his country and a competent interpreter of its ideals to people at home and abroad. By word and action he was a daring leader of men towards whatsoever things he thought to be good, honest, just, and of good report. He himself was, as he once said of a departed friend, "one of the chosen few whose lives and characters and deeds make up that great tradition of human excellence which carries mankind forward."

ROBERT M. LESTER

Dr. Keppel was elected to membership in the American Philosophical Society in 1938. As a member of the Council and of important Committees he rendered the kind of service for which his

unusual qualifications fitted him. At the time of his death he was Vice-president of the Society.

L. P. E.

### KARL LANDSTEINER

(1868-1943)

Dr. Landsteiner was born in Vienna on June 14, 1868, and died in New York on June 26, 1943. Educated in Vienna, he took his medical degree in 1891, but instead of preparing himself for the practice of medicine he followed his stronger bent and fitted himself for the pursuit of a laboratory career as an investigator by devoting several years to the study of chemistry under Emil Fischer in Würzburg, Bamberger in Munich, and Hantsch in Zürich.

The period was propitious for research in medicine; immunology was at the threshold of that development which was soon to become so spectacular and beneficent. Ehrlich and Bordet were launched on their remarkable careers, and Behring had already announced the discovery of diphtheria and tetanus antitoxins and had put them to practical test.

Returning to Vienna in 1897, Landsteiner first attached himself to the Hygienic Institute under von Gruber, one of the discoverers of the phenomenon of agglutination. There he spent only one year and transferred to the Pathological Institute under Weichselbaum, the discoverer of the meningococcus, with which Institute he remained connected during the rest of his years in Vienna, becoming professor extraordinarius of pathological anatomy in 1911. In 1908, Landsteiner was appointed prosector (pathologist) to the Wilhelminen Hospital in Vienna. Thus until the fall and dismemberment of Austria after World War I, Landsteiner was engaged actively in teaching and research, and in the practical work of a hospital pathologist. In order to better his position and to improve his opportunities for scientific work, Landsteiner joined the staff of The Rockefeller Institute in 1922.

Among the earliest of Landsteiner's immunological studies were those which led to the discovery of the blood groups, a discovery which was thirty years later to bring him the award of the Nobel Prize. The investigation which yielded the knowledge of blood groups was not undertaken in haphazard fashion. Serological methods had already revealed that the proteins in various animals

and plants are different and specific for each species. The multi-formity is increased by the fact that also the various organs contain peculiar proteins. The existence of biochemical species specificity prompted the question whether also the individuals within a species show similar, if only slighter, differences. No observations on this point existed. Landsteiner chose the simplest among the possible plans of investigation, as well as the material which gave promise of useful application. Accordingly, he allowed blood serum and blood corpuscles of different individuals to react one on the other. In some cases, no changes were observed; in others the reaction of agglutination or clumping of the corpuscles occurred. The underlying facts of the blood groups had been discovered which further study separated into the four main groups which are the foundation of present-day blood transfusion. Landsteiner sensed the practical value of his discovery, although blood transfusion had long been abandoned.

The idea of treating disease by means of the transfusion of blood from a healthy to a sick person is an ancient one. The first experiments—showing this possibility—were carried out in Oxford. They began in 1658 with Sir Christopher Wren's infusion of medicated solutions into the veins of animals. Lower's classical experiment of passing blood direct from the artery of one dog into the veins of another was performed in 1665, and repeated in London before The Royal Society. Pepys records transfusion in his diary of 1666. In 1667, Denys of Paris transfused the blood of a lamb into a man, and later that year Lower and King carried out a human transfusion before The Royal Society. But the occurrence of fatalities led to the prohibition of the practice in France, and these dangers, together with a long controversy involving theological as well as medical arguments, plunged the practice into neglect where it virtually remained until Landsteiner's discovery more than two hundred years later. But his discovery, which made transfusion a safe, life-saving operation, was not adopted immediately. In 1907-08, Ottenberg carried out the first transfusion with matched blood, that is, the blood of the donor and the blood of the recipient having been proven compatible by the agglutination test. Even then transfusion was employed only occasionally. It was during World War I that it was resorted to frequently; and after the War, the practice became general throughout the world. It was after the

wide recognition of the great medical value of blood transfusion that the Nobel Prize was awarded Landsteiner in 1930.

Blood grouping has found other applications, as in forensic medicine for the determination of paternity and the identification of blood stains, and in studies in heredity and anthropology.

Although Landsteiner's name is primarily associated with the knowledge of blood groups, this discovery constitutes only a small share of the important and new work he accomplished. For example, to mention only two instances, his name is connected also with the mechanism responsible for the singular disease, paroxysmal haemoglobinuria, in which the organism breaks down no inconsiderable part of its own blood when a foot or arm is chilled, and with the transmission of poliomyelitis (infantile paralysis) to old world monkeys, the starting point of the many important investigations since made of that puzzling disease.

But immunology continued to be his main interest, and by 1914 he had formulated and entered on the task which was to occupy him for the rest of his life, and for which his peculiar talents and thorough training, both in chemistry and pathology, especially fitted him. The dominant idea of the long series of researches in this field carried out by Landsteiner and his pupils relates to the dependence of immunological phenomena on chemical structure. Of the two main factors which enter into the immunity reactions, antigen and antibody, Landsteiner chose the former for study, for the reasons that antigens are available in quantity and in relative purity and lend themselves to the complex chemical manipulations which mold their chemical and biological characters. In 1921, he described the haptens, substances which, while capable of uniting with antibodies, are nevertheless incapable of giving rise to immunity.

Landsteiner's fruitful researches on the serological reactions, while primarily of theoretical nature, have also had important practical implications. It has been said of him that he found serology a mass of phenomena and he left it a branch of chemistry, and that his discovery of complex chemospecific antigens and the recognition of chemospecific anaphylaxis made possible the development of a general concept which is able to explain anaphylaxis, allergy, hypersensitiveness, and idiosyncrasy from the same or a similar point of view.

Dr. Landsteiner received the Paul Ehrlich Medal and the Gold



Medal of the Dutch Red Cross Society. He was an honorary member of many societies and academies. He was elected a member of the American Philosophical Society in 1935.

SIMON FLEXNER

FRANK LEVERETT

(1859-1943)

On November 15, 1943, after only two weeks of illness, America's foremost glacial geologist died at his home in Ann Arbor at the ripe age of eighty-four years. Until this final illness he had been accustomed to take his daily walk in the vicinity of South University Avenue and Oxford Road, his residence for the last thirty-four years.

Frank Leverett was born at Denmark, Iowa, on March 10, 1859, the son of Ebenezer Turner and Rowena (Houston) Leverett. He was probably descended (in ninth generation) from Thomas Leverett, who emigrated from Boston, England, to Boston, New England, in 1663; also from Maj. Gen. Sir John Leverett, son of Thomas, and early governor of the Massachusetts Bay Colony (1673-79); and from John Leverett, son of Sir John, the 8th President of Harvard College (1707-24).

Frank Leverett received his early higher education at Denmark Academy and followed this with teaching in the public schools (1878-79), and instructing in the Natural Sciences at Denmark Academy for three years (1880-83). September 1883 to May 1884 was spent at Colorado College, where he devoted himself especially to blowpipe analysis and assaying. His teaching experience, in which he seems to have been very successful, he held to have been of great value to him, and when in 1884 he entered Iowa State College of Agriculture and Mechanic Arts (afterwards Ames Agricultural College), he was able to complete the course in eighteen months and graduate with the degree of Bachelor of Science in 1885.

While still an instructor at Denmark Academy, Leverett became interested in geology. To collect fossil plants he was accustomed to take his class on a field trip to a quarry in the coal measures near Bridgeport, Iowa. One of his specimens he was unable to identify from the descriptions, so he sent it to the paleobotanist, Leo Lesquereux. It proved to be a new species and was named in his honor *Sigillaria Leveretti* Lesqx.

At the Agricultural College, Leverett came under the instruction of a great scientist, the botanist Charles E. Bessey, and he devoted himself to laboratory work in botany and zoology, as well as in chemistry and physics. His graduating thesis was on a flowing well in the Des Moines district, and his first scientific paper was published in 1885 in *Aurora*, a monthly issued at the College. Its title was "Drainage Changes in Eastern Iowa." Leverett was later to become America's foremost authority on drainage changes.

Leverett's early studies of wells brought him into contact with W. J. McGee, then an amateur geologist studying the glacial geology of Iowa, and on Leverett's graduation at the Agricultural College he was advised by McGee to apply for a position to Professor T. C. Chamberlin, then in charge of the Division of Glacial Geology in the United States Geological Survey, as well as President of the University of Wisconsin at Madison. To Leverett's letter of application Chamberlin replied with a request that the young man come to Madison for a conference. Leverett did so, making the long journey from Denmark, Iowa to Madison, Wisconsin on foot, observing carefully on the way the country he was destined later to know more intimately than any other. His future career was then and there determined, for Chamberlin engaged the young glacialist as an assistant on the federal survey; but for one summer only; though this temporary appointment was more than once renewed. Leverett made his headquarters in Science Hall on the University campus, where for many years he occupied an office adjacent to that of the writer of this memorial.

In 1890 Leverett was appointed Assistant Geologist in the United States Geological Survey, in 1901 he was advanced to Geologist, and in 1928 to Senior Geologist. This position he continued to hold until his retirement for age in 1929; in all a period of continuous and distinguished service of forty-three years. The official publications which contained the results of his investigations were marked by great thoroughness and meticulous accuracy. They were issued in massive quarto monographs and reports, in octavo bulletins and water-supply papers, and in folio atlases luxuriously illustrated. Together they exceed in volume the official publications of any other member of the United States Geological Survey since its foundation.

The year 1908 Leverett spent in Europe engaged in a study of the Pleistocene glacial deposits for comparison with those of the

United States and Canada. He was the guest of the glacial geologists of Europe on excursions which covered much of the area glaciated, and on his return he published a "Comparison of North American and European Glacial Deposits" (*Zeitschrift fuer Gletscherkunde*, Vol. 4, 241-295, 321-342, 1910.)

On December 22, 1887, Leverett was married to Frances E., daughter of James and Anna (Frey) Gibson, who died July 10, 1892. He was married, second, on December 18, 1895, to Dorothy C., daughter of Russell and Dorothea (Schmidt) Park, who survives him. There have been no children.

In 1909 Leverett was made Staff Lecturer in Glacial Geology at the University of Michigan, in which capacity he continued each year until 1929 to give an elementary and an advanced course of lectures, both with field excursions for twenty years in all. His advanced course was one much prized by students. Following his retirement the University conferred upon him in 1930 its honorary degree of Doctor of Science.

Dr. Leverett has been honored by election to membership in the National Academy of Science (1939), and the American Philosophical Society (1924). He was elected a fellow of the Geological Society of America in 1891, the year after its foundation. He was a fellow and in 1928 a Vice-President of the American Association for the Advancement of Science. In 1910 he was President of the Michigan Academy of Sciences, Arts, and Letters. He was also a member of the Academies of Science of Iowa, Wisconsin, and Washington (City), the Geological Society of Washington, Corresponding member of the National Geographic Society, and member of the American Geophysical Union, and of the honorary fraternities of Phi Kappa Phi and Sigma Xi.

To honor Dr. Leverett three natural monuments have been given his name. In 1931 an outlet glacier at the head of the Sondre Strömfjord in Southwest Greenland was by the First University of Michigan Expedition named Leverett Glacier (Reports of the Greenland Expeditions of the University of Michigan, 1926-31, Part I, 1931, map on page 9). In the same year the First Byrd Antarctic Expedition gave his name to one of the largest glaciers discovered by the expedition (Lawrence McKinley Gould, "Cold, the Record of an Antarctic Sledge Journey," 210-212, 232, 1931; also "Some Geographical Results of the Byrd Antarctic Expedition," *Geographical Review*, Vol. 21, No. 2, 1931, large folding map

opposite page 194). A few weeks only before his death a great Pleistocene ice-dammed glacial lake in the state of Washington, of the kind to which he had devoted so many years of study, was given his name and afforded him very special satisfaction (*Science*, Vol. 98, No. 2541, September 10, 1943, 227-230). Also a fortnight before his death the excellent bust of Dr. Leverett in plaster was completed by the sculptor, Carleton W. Angell.

Dr. Leverett has been regarded as not only the greatest American glacial geologist of his time, but one of the greatest of all time and all countries. While few of the major conceptions of the science have been associated directly with his name, it has been upon the mass of thorough and accurate field observations correlated and interpreted by him with a masterful grasp on the complete picture that others have built. In making these observations while traveling generally on foot, hardly a township in the Upper Mississippi Valley was overlooked in surveys. His memory for detail was outstanding, and it was only necessary for one to mention a township to have him give the salient glacial features without reference to his notes. In making these surveys Leverett must have walked a distance more than four times the circuit of the earth. Highway commissions made frequent use of his maps and descriptions in locating the sources of road material, and they have paid an enthusiastic tribute to the absolute accuracy of the observations.

There is an extensive Leverett bibliography. His two greater masterpieces are the massive quarto monographs: "Glacial Formations and Drainage Features of the Erie and Ohio Basins," *Monograph 41* of the Geological Survey, 802 pages (1902); and (with Frank B. Taylor) "The Pleistocene of Indiana and Michigan and the History of the Great Lakes," *Monograph 53*, 529 pages (1916).

WILLIAM H. HOBBS

### ABBOTT LAWRENCE LOWELL

(1856-1943)

Abbott Lawrence Lowell was born at Boston on December 13, 1856, and died on January 6, 1943. After a boyhood spent partly in Europe, he entered Harvard College in 1873, graduating in 1877 with highest honors in mathematics, and proceeding to the Harvard Law School and thence to the practice of the law. This last contributed to his range of friendships and interests but did not ab-

sorb him. In 1884 he published *The Transfer of Stock in Private Corporations*, in collaboration with his brother-in-law and partner Francis C. Lowell. Thereafter he moved from law to political science. *Essays on Government* appeared in 1889 and was followed by *Governments and Parties in Continental Europe* (1896), *Colonial Civil Service* (1900; in collaboration with H. Morse Stephens), and *The Influence of Party upon Legislation in England and America* (1902). He made it his special business to discover the nature of the specific interactions of men in society; he steeped himself in Bluebooks, but he was always seeking out the men who did things and asking them the direct questions to which he saw that answers were needed. Nowhere is this quality more conspicuous than in his classic *Government of England* (1908) of which A. V. Dicey wrote, "Professor Lowell's treatise already is, and will soon be acknowledged to be, the standard work on the actual working, in this year 1908, of all the institutions, political, social, or religious, which go to make up the Government of England. His work has, in reality, no rival. . . ." This book was to England what Bryce's *American Commonwealth* was to this country and its value was very widely recognized. Bryce himself, who had read proofs of the book, described it as "the most accurate and appreciative study of the Government of the United Kingdom that has so far as I know ever been produced."

This was distinguished and abiding work, marked by untiring zeal and selfless patience. Yet it would be hard to imagine Lowell spending his whole life in pure research. A care for Harvard was part of his personal heritage, and teaching such as he could give was urgently needed. In 1897 he became Lecturer on Existing Political Systems (a title which describes exactly what concerned him) and in 1900 Professor of the Science of Government. His way of introducing Freshmen to the government of England was characteristic: he started by describing a typical session of the House of Commons and explaining how each feature of the scene had come to be as it was.

In 1909 he became President of Harvard University, and occupied that post until his retirement in 1933. This is not the place in which to seek to characterize his tenure. That is a piece of national history as well as academic history; reaction from the unlimited laissez-faire of free electives, decentralization to promote the education of man by man, the freest generosity to any promis-

ing experiment. He came in days when great expansion was possible, and he knew how to direct it along fruitful lines in various Faculties. After his retirement, he was active as a Senior Fellow in the Harvard Society of Fellows. That he had endowed this was a matter of general belief; but it was not revealed as a fact until after his death when the hitherto anonymous gift became the Anna Parker Lowell Foundation, named after the wife who had been his beloved companion for upwards of fifty years. This was his last project, to afford to a group of young researchers the fullest opportunity for independent development free of material cares or academic requirements. His human generosity in this as in other relationships was unbounded.

Lowell was a teacher, and his writings after he became President of Harvard (*Public Opinion and Popular Government*, 1913; *Public Opinion in War and Peace*, 1923; *Conflicts of Principle*, 1932; *At War with Academic Traditions in America*, 1934; *What a College President Has Learned*, 1938) are contributions from his knowledge, wisdom, and experience to a better general understanding of large issues. So it was that he threw himself with no less zeal than prudence into the work of the League to Enforce Peace and into all other causes which seemed to him likely to promote human well-being. He did with all his might what his hand found to do—whether in such directions as these or in the conduct of the Lowell Institute or as a Trustee of the Boston Museum of Fine Arts.

He became a member of the American Philosophical Society in 1909, and was a Fellow of the American Academy of Arts and Sciences, Corresponding Fellow of the British Academy, Honorary Member of the Royal Irish Academy, Associate Member of the Royal Academy of Belgium, and doctor *honoris causa* of many universities, American and European. We have lost in him a great American, a great citizen of the world, a political scientist of rare equipment, and a man of simple goodness and high courage.

ARTHUR DARBY NOCK

### JOHN MUIRHEAD MACFARLANE

(1855–1943)

In the death of John Muirhead Macfarlane on September 16, 1943, the American Philosophical Society lost one of its oldest members in point of service. Dr. Macfarlane was elected to member-

ship in 1892 and was a member of the Society for fifty-one years. Only one person now living has been a member of the Society for a longer period.

Dr. Macfarlane was born in Kirkcaldy, Scotland, September 28, 1855. He received the B.S. degree in 1880 and the D.Sc. degree in 1883, both from the University of Edinburgh. He was Instructor in Botany at this University from 1881 to 1891 and Curator of the Herbarium from 1884 to 1888. He was also Professor in the Royal Veterinary College (1881-91) as well as lecturer in the Edinburgh College of Pharmacy (1881-87). In 1891 he was invited to this country to address the American Association for the Advancement of Science on the subject of insectivorous plants. While in this country he was elected to membership in the American Philosophical Society. He also received the offer of a professorship in the University of Pennsylvania, which he accepted, becoming Professor of Biology in 1892 and Professor of Botany in 1893. In 1897 he established the Botanical Gardens at the University and from that time until his retirement in 1920 he remained as Director of the Botanical Department of the Botanical Gardens of the University.

When he began his work at the University of Pennsylvania, he found little in the way of equipment or facilities available. When he retired he had the satisfaction of seeing a large and flourishing department equipped with a splendid library and herbarium, a well organized botanical garden and an extensive series of greenhouses housing a rich collection of plants assembled from all parts of the world. Following his retirement the Botanical Laboratory was designated "The Macfarlane Hall of Botany" in his honor.

Dr. Macfarlane was an active investigator and a prolific writer. His bibliography includes about 140 titles, including five books. He became recognized as an outstanding authority on insectivorous plants and was the author of the monographic treatments of these plants in Engler's *Das Pflanzen-Reich*. His botanical activities did not cease with his retirement. For twenty-three years after he became emeritus professor he maintained an active program of scholarly activity, publishing a number of works and leaving considerable unpublished material at the time of his death.

Dr. Macfarlane belonged to a number of scientific societies and academies. He was a fellow of the Royal Society of Edinburgh (1885), and of the American Association for the Advancement of Science, and held membership in the Botanical Society of Edin-

burgh (Secretary, 1885-90), Society for Plant Morphology and Physiology (President, 1898-99), Botanical Society of America, American Society of Naturalists, Academy of Natural Sciences of Philadelphia, the Franklin Institute, Sigma Xi, and a number of other organizations. He received an honorary LL.D. degree from the University of Pennsylvania (1920) and a Litt.D. degree from LaSalle College, Philadelphia (1929). He was awarded the Bankian Medal of the Royal Horticultural Society in 1899.

In common with all students of his day in Scotland, Dr. Macfarlane received a thorough training in the classics and in literature as well as in the field of science. In consequence, he brought to both his research and his teaching a breadth of understanding, a wealth of erudition and an aptness of expression which ensured soundness of scholarship as well as clarity and charm of presentation. Small wonder, therefore, that his students remember him as an inspiring and able teacher, who presented his subject with enthusiasm and lucidity, and with a wealth of illustrative material that greatly stimulated their interest. They also remember him as a gracious and helpful friend, who lived and worked for his students and took a lively interest in them and their problems. He was too much of a Scot to unbend very much, and was never undignified, effusive or demonstrative. Nevertheless, the warmth and cordiality of his nature were in constant evidence and expressed themselves in many ways. He was courteous, considerate, sympathetic, and approachable. He treated his students, even in elementary classes, as fellows and gave them freely and gladly of his time and energy.

Anyone interested in botany was looked upon as a companion and colleague by Dr. Macfarlane. It is not surprising, therefore, that he should devote much of his talent and energy in behalf of those outside the University circle whose avocation was botany. One result of this was his establishment in 1897 of the Botanical Society of Pennsylvania, composed largely of amateurs, an organization which flourishes to the present day, and which continues to play an important role in the acquisition and diffusion of botanical knowledge.

Dr. Macfarlane was blessed with a goodly heritage, a splendid cultural and scientific background, abundant opportunity for the exercise of his talents and a long life. He made the most of his time and opportunities, and the result was an imposing list of con-



tributions to botanical knowledge and an example of sound scholarship and gracious living which will be the life-long inspiration of all who knew him.

RALPH E. CLELAND

WILLIAM FRANCIS MAGIE<sup>1</sup>

(1858-1943)

William Francis Magie was born in Elizabeth, N. J., on December 14, 1858, and died in Princeton on June 6, 1943. He was the son of William Jay Magie, a former chancellor of the State of New Jersey. He graduated from Princeton as valedictorian of the class of 1879, a class that had many other distinguished members, including Woodrow Wilson.

After graduation he remained in Princeton as assistant to Dr. Brackett, then Henry Professor of Physics. Having decided to make physics his life work it was natural at that time for him to go to Germany to pursue advanced work. He matriculated at the University of Berlin and took his doctor's degree under the direction of Helmholtz in 1885. His dissertation was an experimental study of the theory of capillarity.

Returning to Princeton he was appointed to an instructorship in physics during the presidency of James McCosh, advancing to a professorship in 1890. In 1889 Dr. Brackett founded the Graduate School of Electrical Engineering at Princeton and devoted most of his attention to it. Although Dr. Brackett remained the Chairman of the Department of Physics, Magie became more and more responsible for the actual administration of the department, and its expansion from very small beginnings was very largely the results of his efforts. Dr. Brackett retired in 1909 and Magie was appointed Henry Professor in 1910; he retained the chairmanship of the department until his retirement in 1929.

Soon after returning from Germany, Magie began the investigations which formed his main contribution to research. These had to do with the properties of solutions, particularly their specific heats and volumes. He not only gathered together the various measurements made by others but made many determinations himself for the purpose of advancing the theory of solutions. His experimental work was done with great skill.

<sup>1</sup> Reprinted from *Science*, July 1943, 98: No. 2532, 31-32.

Magie was one of the small group of physicists who met in New York in 1899 to found the American Physical Society. He was a member of the first council of the Society and its President during the year 1911-12. He was Vice-president for Section B of the American Association for the Advancement of Science and gave his presidential address at the New Orleans meeting in 1905. He was also a member of the American Philosophical Society.

In university affairs in general Magie took a very active part. For many years he served as clerk of the faculty and was an influential member of many of the important committees of the faculty. In 1912 he was appointed Dean of the Faculty, a position he held until 1925. These administrative duties took so much of his time and attention that in his later years he gradually gave up his activities in research, although he always maintained a keen interest in the work done by his colleagues in the department.

His publications, other than his papers in his field of research, included a revision of the *Text-Book of Physics* by Anthony and Brackets, a text which was widely used in the latter part of the last century. He was a firm believer in the value of the study of physics for the general student, particularly the historical development of the principles. With this in view he wrote his *Principles of Physics* which gives an admirable account of the rise and content of physical theories. He was a master of clear and concise exposition in the best of English. He also translated Christiansen's *Theoretical Physics*, and edited the important contributions of Carnot, Clausius, and Thomson to the second law of thermodynamics for Harper's series of *Scientific Memoirs*. When the series of source-books in the sciences was being planned Magie was asked to contribute the volume on physics. This work he began on his retirement in 1929 and he devoted much time and energy to compiling and translating extracts from the memoirs that have had the greatest influence in the development of physics. He was often called upon to speak and write about the life and work of Joseph Henry, a subject of particular interest to him because of Henry's relation to Princeton.

The honorary degree of LL.D., was conferred upon him by the College of Wooster in 1916, and Princeton gave him the honorary degree of D.Sc., upon his retirement.

In 1894 he married Miss Mary Blanchard Hodge, of Princeton, who survives him, as does his sister.

No account of Dean Magie's life would be at all adequate without an appreciation of his loyalty to his associates and the very real affection that all of us who had the privilege of working with him felt for him.

E. P. ADAMS

### HOWARD HAWKS MITCHELL

(1885-1943)

Howard Hawks Mitchell, Professor of Mathematics at the University of Pennsylvania, was born at Marietta, Ohio, on January 14, 1885, and died in Merion, Pennsylvania, on March 13, 1943. He received the degree of Bachelor of Philosophy from Marietta College in 1906. He entered the Graduate School of Princeton University in 1906 and remained there until he received the doctorate in 1910. After one year as an Instructor in the Sheffield Scientific School of Yale University, he accepted a similar position on the Faculty of the University of Pennsylvania. He was promoted to an assistant professorship in 1914 and to a full professorship in 1921. During the First World War he served as ballisticsian at the Aberdeen Proving Ground. In the summer of 1927 he was a Visiting Professor at the University of Chicago. In 1925 he was elected to membership in the American Philosophical Society. He was honored by the American Mathematical Society by appointment to the following offices: Vice-president, 1932-33; Member of the Council, 1920-22. In 1932 he was Vice-president and Chairman of Section A of the American Association for the Advancement of Science. In December 1933, he delivered his retiring address; the title of this address was: "Linear Groups and Finite Geometries." In 1935 he was awarded the honorary degree of Doctor of Science by Marietta College.

Professor Mitchell's chief research interests were in the fields of linear groups and algebraic number theory. His dissertation, "Determination of the Ordinary and Modular Ternary Linear Groups," was written under the inspiration of Professor Oswald Veblen. The results are important in the field of linear groups. The methods are mainly geometric and were used by him in a later discussion of the quaternary groups.

In the field of algebraic numbers, particular attention is directed to two papers, "On the generalized Jacobi-Kummer cyclo-

tomic function," published in the *Transactions* of the American Mathematical Society in 1916, and "On the congruence  $cx^\lambda + 1 \equiv dy^\lambda$  in a Galois field." In the first paper some classical results of Kummer are generalized while in the second paper the discussion of a part of the work of the earlier paper is extended. Some years later he collaborated with L. E. Dickson, H. S. Vandiver, and G. E. Wahlin in preparing an extensive report on "Algebraic Numbers" which was published by the National Research Council in 1923. Later he became much interested in the analytic theory of numbers and the theory of algebras.

Professor Mitchell was a man who was widely read in various fields of mathematics. His lectures were models of exposition. While always sympathetic with, and eminently successful in, handling the problems of the undergraduate student in mathematics, it was in the work of the Graduate School that he made his greatest contribution as a teacher. Here his keen mathematical intuition and his fine sense of scholarly values rendered him a fruitful source of inspiration to all who were privileged to come under his influence. Graduate students who wrote dissertations under his direction found him most helpful in his guidance and insistent upon a product that was elegant. Work under his direction left the student with avenues for additional investigation after the formal requirements of the dissertation had been satisfied.

Professor Mitchell's services as an editor of various mathematical journals were outstanding. In 1915 he was made an associate editor of the *Annals of Mathematics*. In 1920 he was appointed to a similar position on the *Transactions* of the American Mathematical Society. In 1925 he was elected a member of the Editorial Committee of the latter journal and served in this capacity with distinction until 1930. Here he insisted upon the highest mathematical standards. The keen mathematical intuition to which we have referred enabled him to be most helpful to authors in making manuscripts conform to the high standards he and his fellow editors set for American mathematical publications. He was especially sympathetic in handling the work of younger mathematicians and his suggestions for the manuscript under consideration and for future work were the means of inspiring the authors to further valuable work.

Professor Mitchell was a kindly gentleman with broad interests

and high ideals. In every manner he exemplified the finest traits that one associates with American scholarship.

J. R. KLINE

WILLIAM FOGG OSGOOD<sup>1</sup>

(1864-1943)

William Fogg Osgood was born in Boston on March 10, 1864, son of William and Mary (Gannett) Osgood. In July 1890, he married Therese Ruprecht, by whom he had two sons and a daughter. In August 1932, he married Céleste Phelps Morse, who survives him. He died on July 22, 1943.

Osgood was prepared for college at the Boston Latin School and became a member of the class of 1886. He took second-year honors in classics, and final highest honors in mathematics. There was little in the Harvard curriculum at that time to inspire a young man to give his life to mathematical research. The only member of the Mathematics Department, actively interested in scientific advance, was the youthful Benjamin Osgood Peirce, and his interest lay largely in the field of physics. But Osgood had early absorbed the idea that mathematics was the most difficult subject to be studied, and he meant to try for the biggest prize.

On graduation from Harvard he spent one more year in Cambridge as a graduate student, then went abroad for three years of advanced study in Germany. He spent the first two years in Göttingen, working especially under that prince of teachers, Felix Klein. His third year was in Erlangen, and there he took his doctorate. The years spent in Germany determined absolutely his whole future life. He married a German woman.\* He acquired such a mastery of German that his most important scientific writings were in that language. He adopted the German *Weltanschauung* to an extent that it became somewhat embarrassing during the first World War. In the present crisis he saw matters in a different light. He received a mathematical impulse which guided his scientific thinking for the rest of his life.

Osgood returned to Harvard to teach in the autumn of 1890, thus beginning a connection which remained unbroken until the time of his retirement at the age of 69, in 1933. His was a distin-

<sup>1</sup> Reprinted from *Science*, November 1943, 98: No. 2549, 399-400.

guished and successful career. He saw the need for real improvement in the Harvard mathematical teaching. Byerly was an outstanding teacher in introductory courses, and J. M. Peirce was patient and conscientious, but there were others in the teaching force who lacked both didactic skill and scientific interest. Osgood undertook to improve this situation. His teaching, whether of freshmen or graduates, was careful, clear, and conscientious. He introduced a standard of rigor in Harvard mathematics which had been quite absent before. Many students received from him standards of absolute exactness and scientific honesty which lasted them through life. He wrote four text-books which were admirable for clearness and care. He never forgot the importance of linking up mathematics with physics. It is fair to say that to him this meant the application of classical mathematics to classical physical questions, rather than adapting new mathematical techniques to new physical demands.

Osgood pursued a life of scientific activity without haste and without rest. After his retirement from Harvard he spent two interesting years at the National University in Peiping, publishing two books, in English, which supplemented some of his earlier work.

He had returned from Germany at a critical moment when a number of young Americans, with training and ideals like his own, were determined to raise American mathematics to the standard of the subject in Europe. This was done partly by individual contributions, partly by founding and fostering the American Mathematical Society. Osgood was the eighth president. The essential quality of his own mathematical contributions, some seventy in number, was soundness. Whatever he wrote was rigorous and significant. He had a clear idea of what he believed to be of permanent importance in mathematical science, and that alone claimed his interest. He had no interest in the flashy or trivial. He was suspicious of devices which seemed too ingenious, fearing hidden difficulties. When a young man of thirty-two, he was invited to contribute one of the most important articles to the universal mathematical bible, the *Encyklopädie der mathematischen Wissenschaften*. His *Lehrbuch der Funktionentheorie*, which ran into no less than five editions, is the classical treatise on this fundamental subject. There was perhaps little change either in his scientific thinking or technique during the course of his career. In Germany he had such a large vision of the sort of work he would like to do,

that its accomplishment and natural extensions sufficed for the whole of his productive life.

Osgood had two compelling loyalties, to mathematical science and to Harvard University. Utterly lacking in personal ambition, he had the highest hopes for the Harvard mathematical school. He took little share in the wider parts of university administration, but was characteristically conscientious in performing specific tasks, however monotonous. He was unwearied in his acts of kindness to individual students, and he treated all with an old-fashioned courtesy which sprang from his deep love for his fellow man.

He was elected a member of the American Philosophical Society in 1915.

JULIAN L. COOLIDGE  
GEORGE D. BIRKHOFF  
EDWIN C. KEMBLE

### WILLIAM LYON PHELPS

(1865-1943)

One who never turned his back but marched breast forward,  
Never doubted clouds would break,  
Never dreamed, though right were worsted, wrong would triumph,  
Held we fall to rise, are baffled to fight better,  
Sleep to wake.

Browning: *Epilogue*.

In the vigorous and generous philosophy of William Lyon Phelps, the vital force is human sympathy. It is manifest in the breadth of his interests and in the intensity of his appreciations of life and literature, but his sympathies are never "with the slothful, with the mawkish, the unmanly." His is a virile philosophy ardently pursued. The pursuit of knowledge, the pursuit of happiness, the pursuit of arts and letters, were not to him stock phrases but urgent challenges to the questing spirit. His own response gladly embraced the ardors as well as the delights of the chase, with its insistent demands

to keep the nerves at strain,  
To dry one's eyes and laugh at a fall,  
And, baffled, get up and begin again,—  
So the chase takes up one's life, that's all.

It is an eager and valiant philosophy of life; manhood's measure is

the dauntless spirit. It holds militant faith that the conquest of life is open to unconquerable hope and courage.

I count life just a stuff  
To try the soul's strength on, educe the man.

In making the firm and heartening tenets of Browning's creed his own, Professor Phelps taught them, in classroom and out of it, with the fervor of a disciple and with the insight of a master.

In his philosophy of teaching, as of life, Professor Phelps remains an ardent humanist. His essential concern is with Humane Letters—with literature as one of the Fine Arts. When, in 1894, as a promising young instructor, he was encouraged to offer his first elective course, *Elizabethan Drama*, he defined it as "a purely literary course" that "will require from every student a large amount of reading." And when, next year, he daringly led a volunteer army of two hundred and fifty undergraduates into the then revolutionary field of *Modern Novels*, his reading requirement was equally unprecedented—"An entire novel is read for each [weekly] lesson." The compelling force, however, from the outset and throughout a long lifetime of teaching, was ever his own irresistible enthusiasm for the world of men and of books. To him teaching was at once a high calling and a human mission. He taught the humanities of learning and life so fervently that they became valid and vital even to the dull and to the incurious. The words that Browning put into the mouth of Fra Lippo Lippi to voice the artist's creed find answering echoes in the teacher's faith.

For, don't you mark? we're made so that we love  
First when we see them painted, things we have passed  
Perhaps a hundred times nor cared to see;  
And so they are better, painted—better to us,  
Which is the same thing. Art was given for that;  
God uses us to help each other so,  
Lending our minds out.

In Browning's enlarging philosophy, art, literature, and music are kindred Fine Arts of inspiration and of interpretation of the fundamental relation of art to life. Here, again, in making Browning's generous philosophy his own, Professor Phelps gave himself gladly to minister to the needs of men. In him the quality of teaching was twice blest.

The questing spirit that made him, almost half a century ago, a pioneer in opening the college curriculum to courses in contempo-



rary fiction and drama early led him far beyond academic confines. Versatile and magnetic gifts as lecturer, preacher, critic, and author, mated with a mind that counted nothing that is human alien to his vital sympathies, have given him, for decades, an audience nationwide and keenly responsive. His stimulating influence on the reading public and his generous and often decisive encouragement of writers young and old have long made him a beneficent force and a beloved personality in the republic of letters. In amazing measure he imparted to others his own immediate delight in literature in the making, and his enduring love of the classics of literature, ancient and modern. The titles of two of his books—*Human Nature in the Bible* and *Human Nature and the Gospel*—are especially arresting and characteristic. Here, as in countless writings and addresses, his constant search is for the meaning of life as interpreted in human experience and in literature that holds the mirror up to human nature.

This world's no blot for us,  
Nor blank; it means intensely, and means good:  
To find its meaning is my meat and drink.

What he found and gladly shared with others was a gospel of good tidings and of good will to men.

The conclusions of his active life and of his written *Autobiography* consistently affirm a positive creed. "For a shallow optimism I have no respect whatever. But if optimism means one believes that in the long run truth will survive error and good will triumph over evil and that life is an experience for which one is grateful, then I am most certainly an optimist." That enheartening philosophy of life he gladly taught and exemplified, "in simplicity and gentleness and honor and clean mirth." His loyal legions of students and followers gratefully recognize that he gave them many keys to unlock the doors to Kings' Treasuries and to the House of Life, but among them his master-key was Browning. His own fulfilment of life recalls instinctively the valiant and triumphant *Epilogue*, yet need not exclude the conclusion of the earliest of Browning's poems as it faces the issues of life and death.

I believe in God and truth  
And love . . .  
All in whom this wakes pleasant thoughts of me  
Know my last state is happy, free from doubt  
Or touch of fear. Love me and wish me well.

GEORGE H. NETTLETON

William Lyon Phelps was elected a member of the American Philosophical Society in 1927 and was a member of the Council from 1932 to 1936. He attended the meetings frequently and presented papers at various meetings. In particular, on November 26, 1937, he gave the evening lecture on "Truth and Poetry" and the Franklin Medal was presented to him on that occasion.

L. P. E.

### JOHN CAREW ROLFE

(1859-1943)

John Carew Rolfe, Professor Emeritus of the Latin Language and Literature at the University of Pennsylvania, died March 26, 1943. He was born in Lawrence, Massachusetts, October 15, 1859. He was fortunate in the background of his home. His father was the eminent Shakespearean Scholar, William J. Rolfe, and his mother was distinguished for social charm and genial disposition which her eldest son also possessed to such a notable degree. He received his A.B. from Harvard University in 1881, his A.M. in 1884. After teaching three years as an Instructor at Cornell University he received his Ph.D. there in 1885. He spent 1889-90 as Instructor in Greek and Latin at Harvard University and then passed on to his professorial career at the University of Michigan. He left Ann Arbor in 1902 to serve for thirty years at the University of Pennsylvania as Head of the Latin Department. In this position he showed a democratic spirit, a modest deference to the opinions of others, however humble their rank might be, and a fairmindedness that established among his associates a notable esprit de corps. These qualities characterized him, indeed, in all his relations with his fellowmen. While he possessed his share of the dignified reserve that is not uncommon in persons of old New England stock, his students added affection to their respect for him as a superior teacher and scholar, and particularly when they had the privilege of knowing him in his hospitable home. Upon his retirement he became a special Lecturer in the Department until 1937, and true to his industrious disposition, he continued scholarly work almost to the day of his death.

Professor Rolfe was no narrow specialist. His year at the American School of Classical Studies in Athens 1888-89, during which he participated in important excavations at Plataia, early

turned his attention to archaeology. He served with zest as Annual Professor in the Classical School of the American Academy in Rome in 1907-08, as Professor in Charge of the School in 1923-24, and thereafter as a Trustee of the Academy, attending the meetings of its Board with an especial fidelity and pleasure.

He was long associated with Dr. Charles Bennett of Cornell University as an editor of the "College Latin Series" published by Allyn and Bacon, and himself published a number of textbooks. To the general public he is best known for his excellent translations in the Loeb Classical Library, Suetonius, Sallust, Gellius, Nepos, Ammianus Marcellinus, and Quintus Curtius, the last unfinished at his death. He also translated Gentili *De Jure Belli* in the series of Classics of International Law. In 1923 he published in the series "Our Debt to Greece and Rome" an important volume "Cicero and His Influence." His contributions to scientific periodicals on philological and archaeological topics gave him a wide reputation among scholars at home and abroad. He wrote in a simple, lucid style that reflected his speech in the classroom and on the lecture platform, and he exemplified his interest in literature outside his specialty by his regular attendance at meetings of the Shakespeare Society of Philadelphia, which he much enjoyed.

He served as a member of the Executive Committee of the American Council of Learned Societies. The University of Pennsylvania and Oberlin College conferred on him the degree of Litt.D. He was elected a member of the American Philosophical Society in 1907. He was President of the American Philological Association in 1910-11, and belonged to other learned societies. In 1931 he was complimented by the publication of a memorial volume "Classical Studies in Honor of John C. Rolfe."

Professor Rolfe greatly loved the outdoor life. He and his brother, Dr. George W. Rolfe (Harvard—1885), a practising chemist and long a teacher at the Massachusetts Institute of Technology, owned neighboring summer homes at Oak Bluffs on the Island of Martha's Vineyard. Bicycling (in his early days), fishing, swimming, canoe-trips, gardening kept Professor Rolfe in excellent health during his long career. To this he owed, no doubt, in part his characteristic equanimity, dependable judgment and cheerful patience. His keen sense of humor and rare ability to tell apt stories tersely made companionship with him delightful. He was loyal to his friends, steadily enriching their affection and admira-

tion for him. Truthful and sincere, courteous and kindly under all circumstances, he was for many who knew him their ideal of a fine gentleman.

WALTON BROOKS McDANIEL

FRANK SCHLESINGER

(1871-1943)

With the death of Frank Schlesinger, astronomy of position has lost its most eminent representative—distinguished alike by the precision, originality, and efficiency of the methods which he developed.

His apprenticeship was no easy one. Born in New York, May 11, 1871, the youngest of seven children, he was graduated from the College of the City of New York in 1890. For six years he was engaged as a surveyor in his native city. Then he was appointed to a University Fellowship at Columbia where he received the degree of M.A. in 1897 and Ph.D. 1898.

After a summer as research assistant at the Yerkes Observatory, he was appointed Observer-in-Charge of the New International Latitude Observatory at Ukiah, California, which he established, and conducted for four years. This was strenuous work, of the old school in its visual observation half of which had to be done in the hours before dawn, but modern in the high precision of its results.

His first opportunity to show his mettle came in 1903 when the Carnegie Institution sent him to the Yerkes Observatory for photographic observations of stellar parallax. Here was a field excellently adapted to Schlesinger's abilities. It was already realized that more accurate observations could be made by photography than by any previous method, and Kapteyn had recognized some of the more serious sources of error, and suggested ways of escape from them; but much remained to be done, and Schlesinger did it so well that the methods which he developed are still in use—after nearly forty years, during which thousands of parallaxes have been observed—for the simple reason that no important improvements upon them have yet been devised. He introduced the rotating sector, which cuts down the image of a bright star and makes it comparable with those of the faint reference stars. Observations

of thousands of the brighter stars have been made possible by this device.

In the measurement of the plates, and the calculations for their reductions, his procedure showed his combined sense for precision and for economy. No precaution was spared whose neglect might have impaired the accuracy of the results; but wasted time and "lost motion" were eliminated, often by devices of great mathematical elegance, such as his "method of dependencies" for abbreviating the reductions.

Passing with this experience to the directorship of the Allegheny Observatory, he found a long-established institution under reorganization. Generous aid was provided by the people of Pittsburgh and the vicinity; the Observatory was moved to a new and favorable site; and a great telescope installed. At such a time as this, it is even truer than usual that the primary need of an observatory is a first-class director. Schlesinger's peculiar gifts came into full play—his foresight and sound judgment in choosing fields of work, and his grasp of their essential requirements both in instruments and method. The great refractor was designed exclusively for photographic observation, and is still the most powerful existing instrument for its purpose. With this he began an extensive program of observations for stellar parallax, which is still being continued at the Observatory. It was found that the city smoke, though dimming the brightness of the stars, had no ill effect upon the sharpness of their images, and the long series of Allegheny parallaxes—now more than 1500 in number—are of very high accuracy.

One feature of this program illustrates his scientific conscientiousness. The minute and unavoidable errors in even the best observations once in a while make a calculated parallax which would be small anyhow come out negative. This is an absurd result, placing the star on each of two lines which diverge farther and farther from each other at great distances. Parallax observers are human; and the temptation is very strong to take a new set of observations on the star, in the hope of getting a more reasonable result. To throw away the old value and substitute the new would be scientifically immoral; but Schlesinger realized that even to take the average of the old and new results is not really playing fair. It amounts to correcting those cases in which the errors of observation make the result come out too small, and ignoring the equally

numerous cases when they make it come out too great; and this vitiates the general average. Schlesinger left them in his list and kept on observing more stars.

Much excellent spectroscopic work was also done at Allegheny by Schlesinger and his associates, and the orbits of many spectroscopic double stars were determined. The formulae which he developed for the precise calculation of these orbits are still in general use. Special mention should be made of his work on the eclipsing binary  $\alpha$  Herculis—one of the very first instances in which the actual sizes, masses, and densities of a pair of stars were deduced exclusively from observation. He was the first to point out (in 1909) that when the brighter star of such a pair is going into eclipse the unobscured portion of its disk will, on the average, be moving away from us, owing to its rotation; and contrariwise when it is coming out. This rotation effect has proved to be of considerable importance.

In 1920 Schlesinger was called to Yale, where he remained as Director of the Observatory for twenty-one years. He found a long-established astrometric tradition, which he continued and expanded in two directions. A photographic refractor of 26 inches aperture was installed at Johannesburg. With this the parallaxes of more than 1600 southern stars have been observed, under the direction of Dr. Alden.

His last contribution in this field—and one of the most valuable to astronomers—is found in his general catalogue of stellar parallaxes, in which the results of all observers are collected, critically examined, corrected for their minute outstanding errors, and combined into mean values. The preparation of such a work demands the highest degree of knowledge of the subject, and impartial critical judgment. Subsequent studies have not only confirmed his conclusion that his catalogued values are, on the average, systematically correct within a thousandth of a second of arc, but have shown that the probable error assigned to their individual values substantially represent their real accuracy—an achievement almost without precedent.

Schlesinger's second main activity at Yale was the planning and preparation of the great photographic catalogues of star positions. Accurate determinations of the apparent places of stars in the heavens could formerly be made only by visual observations with the meridian circle, and this remains the only way for finding

absolute positions, referred to the pole, equator, and equinox. But such observations are laborious and costly, and it is much more economical, as well as more accurate, to determine a smaller number of reference stars in this way, and use photographs to fill in the others between them. Here plates covering a large area in the sky have a great advantage. About the same number of stars are required *per plate* as reference points whether this is large or small; hence the total number of such points needed to cover a given large zone of the heavens varies inversely as the area of the plates.

This raised a set of new problems, for example, to design lenses for wide-angle cameras so that accurately measurable star-images could be secured all over the plate; to extend the methods of reduction so as to take account of many terms which were negligible on small plates and important here; and to devise economical methods for handling the enormous amount of measurement and calculation involved.

An objective, giving good images over a region  $5^\circ$  square, was at first used, and later one covering a field  $12^\circ$  on a side.

Special measuring engines were designed to handle the larger plates with precision, and special and very ingenious methods of reduction were developed.

Schlesinger's description of the whole—with his usual concise lucidity—in the introduction to Volumes 4 and 9 of the *Transactions* of the Astronomical Observatory of Yale University is by far the best text-book on the subject which exists, and makes any other unnecessary.

The results were impressive. The nine volumes of Yale *Zone Catalogues* so far published contain accurate positions of more than 91,000 stars; while catalogues including 55,000 more are in various stages of preparation—an amazing output for a single observatory of moderate resources. The precision of these observations considerably surpasses that of the older catalogues observed by other methods, and the hours of observing- and computing-time were very much less. Valuable as these catalogues are in providing astronomers with points of reference from which to measure the positions of other objects, they are still more so since, by comparison with the usual observations of the later part of the last century, they determine the apparent proper motions in the heavens of all the stars.

From those a wealth of information can be derived regarding the

distances, motions, and brightness, and other properties of the stars. They are rich mines, which will be worked for many years to come.

Schlesinger's work brought him many and well-deserved honors. Our Society was the first to recognize his quality, electing him a member in 1912. The National Academy of Sciences followed in 1916 and the American Academy of Arts and Sciences in 1921. He was elected President of the American Astronomical Society, 1919-22; and of the International Astronomical Union, 1932-35; was made a Foreign Associate of the Royal Astronomical Society in 1914; a Corresponding Member of the French Academy of Science in 1932; and a Foreign Member of the Royal Society of Sciences of Upsala in 1938.

He received the honorary degree of Doctor of Science from the University of Pittsburgh in 1920, and from Cambridge University in 1925, and was appointed as Officer of the French Legion d'Honneur in 1935.

The Valz Medal of the French Academy of Sciences was awarded to him in 1926, the Gold Medal of the Royal Astronomical Society in 1927, the Bruce Medal of the Astronomical Society of the Pacific in 1929 and the Townshend Medal of the College of the City of New York in 1935.

Two things stand out among his personal characteristics—his high ethical standards and his genius for friendship.

Those who sought his advice—as the writer often did—were equally impressed by his thorough grasp of the scientific and professional aspects of the situation and his keen alertness to the moral and human implications of the policies involved.

His success in securing results of notable accuracy and amount with moderate expenditure of the funds for which he was responsible gave him justifiable pleasure, but he never overworked his subordinates nor disregarded their interests.

He was the center of the "Neighbors"—that informal group of astronomers, without organization or officers which met at New Haven every few months for years. Old and young alike felt equally his cordial and personal interest, and joined in his spirit of good-fellowship.

He retired from the directorship of the Observatory in 1941 and bore the gradually increasing limitations of ill-health with quiet courage until the end came. He will be long and sorely missed.



He was twice married: in 1900 to Eva Hirsch of Ukiah, who died in 1928, and in 1929 to the former Mrs. Philip Wakeman Wilcox of New York, who survives him, along with one son by the first marriage, F. Wagner Schlesinger, now of the Franklin Institute of Philadelphia.

HENRY NORRIS RUSSELL

JAMES BROWN SCOTT

(1866-1943)

The name of James Brown Scott has long been identified with the study, teaching, and practice of International Law in the United States. He was born in Ontario, Canada, on the 30th of June, 1866. His father, a native of Scotland, moved to the United States when his son was a boy and Dr. Scott was educated at Harvard where he took both his A.B. and M.A. in 1890 and 1891. For the next three years he studied in Berlin, Heidelberg, and Paris as a Parker Fellow of Harvard University. In 1894 he received the J.U.D. Degree from Heidelberg. His specialty in those studies was International Law; his passion was for teaching. Two years after his return from Europe he was Dean of Los Angeles Law School. Three years later, in 1899, he moved to the University of Illinois, again as Dean of the College of Law. From Illinois, continuing a movement eastward as have so many of our distinguished law teachers, he became Professor of Law in the Columbia University Law School, where he might well have stayed continuing his legal studies and his teachings, had not Elihu Root, then Secretary of State, invited him to come down as Solicitor of the State Department. Root later wrote to President Nicholas Murray Butler,

I consider it one of the most fortunate events of my administration of the State Department that I was able to secure him for Solicitor. He came to the State Department without any influence or backing of any kind. I had never known him and nobody spoke for him. He was selected solely for what he has already done and from what I could learn from inquiries I made.

From that time until Mr. Root's death he and Dr. Scott were closely associated on many occasions. Dr. Scott was a devoted admirer and follower of Mr. Root and continued to work with him, as when Dr. Scott accompanied Mr. Root in 1920 to the meeting at The Hague

of a committee of jurists to draft the statute of a Permanent Court of International Justice; in the American Society of International Law which Dr. Scott was largely responsible for founding and of which Mr. Root was President for its first fifteen years; in the work of the Carnegie Endowment for International Peace of which Mr. Root was President and of which Dr. Scott served as Secretary and Director of the Division of International Law from the inception of the Endowment until 1940, and Secretary Emeritus until his death.

Dr. Scott never gave up his teaching. He was Professor of Law and of International Law at George Washington University and later at Georgetown for many years, including also a Professorship of Roman Law at the Georgetown University Law School from 1935 to 1940. From 1909 to 1916 he was also Lecturer on International Law at the Johns Hopkins University.

Through his wide learning, his ability to preside over and address meetings fluently in French, German, Spanish, or English, Dr. Scott came more and more to make his influence felt in many different organizations in many different countries. His position with the Carnegie Endowment for International Peace gave him an opportunity to exercise a strong influence on trends and developments in the study of International Law in many parts of the world. In the later years of his life there were two causes which were particularly close to his heart: The establishment of the equal status of women in all matters within the field of International Law and especially in the matter of nationality; and the demonstration of the important role which the Spanish theological jurists of the sixteenth century played as precursors of Grotius in the development of the science of International Law. Dr. Scott's services in popularizing the services of Francisco de Vitoria, amazingly enough, are memorialized in one of the murals of the Department of Justice Building in Washington; Boardman Robinson in painting the figure of Vitoria placed on the Dominican's shoulders the head of Dr. Scott—an excellent likeness.

One of the other causes to which he devoted himself and with which his name will always be associated, was the establishment of the *Academie de Droit International de la Haye* of which the *Receuil de Cours* is one of the great compendiums of modern thinking on International Law. Dr. Scott himself lectured at the *Academie* and conducted seminars there from time to time.

Dr. Scott was always deeply moralistic and at times even mystical in his approach to legal science and always highly idealistic in his efforts to improve international relations.

He was President of the American Society of International Law from 1929-39, and Honorary President from that year until his death. His role in the Society included also his services as Editor in Chief of the American Journal of International Law from 1907 to 1924. He was founder and President of the Instituto Americano de Derecho Internacional, and member and President (1925-27; 1928-29), of the Institut de Droit International.

His activity in international conferences is indicated by the following list of positions which he held:

Technical Delegate to Second Hague Peace Conference, 1907; Special Adviser, Department of State, Chairman, Joint State and Navy Neutrality Board, 1914-17; Technical Delegate to Paris Peace Conference, 1919; Technical Adviser to Arms Conference, 1921-22; Chairman, U. S. Pan-American Commission of Jurists to prepare codes of private and public international law, Rio de Janeiro, 1927; delegate to 6th Pan American Conference, Havana, 1928; Chairman, American Delegation, Congress of Rectors, Deans and Educators, Havana, 1930; delegate to 4th Pan American Commercial Conference, Washington, 1931; commissioner of United States on commission created under Bryan Treaty for Advancement of Peace between United States and Norway, 1928; President, Permanent Commission of Conciliation, Belgium and Switzerland, 1928; designated by Guatemala as member of Central-American International Tribunal, 1928; appointed President, Danish-Polish Conciliation Commission, 1929; member, Polish-Brazilian Conciliation Commission, 1935; Commission of Investigation and Conciliation between Cuba and Peru, 1936; Dano-Venezuelan Permanent Commission of Conciliation, 1937; Permanent Commission of Conciliation between Belgium and Switzerland, 1937; appointed Chairman, Permanent Commission of Conciliation between Chile and Poland, 1937.

In international gatherings he was a skillful draftsman, a shrewd negotiator and a persuasive conciliator. He was an indefatigable worker as even an extract from the list of his publications attests:

*The Hague Peace Conferences of 1899 and 1907* (2 vols.), 1909; *An International Court of Justice*, 1916; *Peace Through Justice*, 1917; *Survey of International Relations Between the United States*

*and Germany* (August 1, 1914–April 6, 1917), 1918; *James Madison's Notes of Debates in the Federal Convention of 1787 and Their Relation to a More Perfect Society of Nations*, 1918; *The United States of America*, 1920; *Robert Bacon, Life and Letters*, 1923; *Le Français—Langue Diplomatique Moderne*, 1924; *Sovereign States and Suits*, 1925; *Cuba, La America Latina, Los Estados Unidos*, 1926; *The United States and France: Some Opinions of International Gratitude*, 1926; *Le Progrès du Droit des Gens*, 1930, 1931, 1934; *De Grasse à Yorktown*, 1931; *The Spanish Origin of International Law—Part I, Francisco de Vitoria and His Law of Nations*, 1934; *The Catholic Conception of International Law*, 1934; *The Spanish Conception of International Law and of Sanctions*, 1934; *Conferencias del presidente del Instituto Americano de derecho internacional preparados en homenaje a la Universidad mayor de San Marcos*; *Law, the State, and the International Community* (2 vols.), 1939. Much of his work was devoted to compilations of materials and his *International Law Case Book* has been widely used in American Law Schools.

Dr. Scott's abilities and services were widely recognized. He received the degree of Doctor of Laws *honoris causa* from the following universities in ten different countries: George Washington (1912), St. John's College, Annapolis (1916), San Marcos, Lima, Peru (1924), Chile (1927), Syracuse (1927), Paris (1927), Salamanca (1927), Warsaw (1929), Habana (1930), Cambridge (1931), Michigan (1932), Oberlin College (1933), Lyons, France (1933), Kingston, Ontario (1937) and Athens (1937).

He was elected a member of the American Philosophical Society in 1930. He was decorated with the Order of Commandant de l'ordre de la Couronne de Belgique; Commandant de l'ordre d'Orange Nassau des Pays-Bas; Grand Officier de la Couronne de Roumanie; Commander of the Crown of Italy (1930); Order of merit with the grade of Commander (Ecuador, 1935); Order of Merit of Chile (1936); Grand Cross of the Order of Carlos Manuel de Cespedes, Cuba (1929); Grand Cordon of the Order of Saint Sava (Yugoslavia, 1935) and Order of the White Eagle of Serbia; Commander of the Legion of Honor (1930).

Always a kind and sympathetic person, Dr. Scott, exercised an influence over several generations of American international lawyers. He was not in good health for some years before his death and he died on June 25, 1943, at his home in Annapolis, Maryland.

He is buried in Arlington National Cemetery near Washington, D. C.

PHILIP C. JESSUP

WILLIAM ALBERT SETCHELL

(1864-1943)

William Albert Setchell was born in Norwich, Connecticut, April 15, 1864, and died in Berkeley, California, April 5, 1943. A vivid and attractive personality brought him a wide circle of friends and his ability and passion for work early raised him to leadership in his chosen field.

His first botanical paper was published before he was twenty. Graduating from Yale in 1887 he went to study with Farlow at Harvard and began research on fungi and algae. The latter group became his life work.

His interest in algae led to his appointment to take charge of the botanical work at the Marine Biological Laboratory at Woods Hole in 1890. (Previous instruction in botany had been given, for one summer, by J. Ellis Humphrey.) Setchell rapidly developed the department and in 1892 a botanical building was erected. He continued in charge until 1895 when he went to California. In this year he began, in collaboration with F. S. Collins and I. Holden, the largest collection of dried algae ever issued. It ran through fifty-one volumes and was entitled *Phycotheca Boreali-Americana*.

After serving four years on the Yale Faculty (1891-95) he became in 1895 Professor of Botany and Head of the Department at the University of California. Here he entered an algalogical paradise. He was fortunate in finding a collaborator in N. L. Gardner and together they accomplished a monumental work. A very large number of new species were described with care and thoroughness, excellently documented and illustrated. These pioneer publications may be regarded as models of their kind. Setchell also investigated the algae of Hawaii and of other parts of the Pacific. In visits to Europe and Asia he was able to examine type specimens, some of which he brought back to Berkeley where he built up one of the largest algal herbaria in the country.

He also studied certain physiological questions, such as the parasitism of red algae and regeneration in kelps. He became deeply interested in the distribution of algae as controlled by ocean

temperatures. He also investigated the algae of hot springs with interesting results. As the result of his visits to coral reefs he developed suggestive ideas about their structure and geological history.

He devoted considerable attention to the economic uses of algae and had an important part in the publication by the United States Government in 1911 on the algal resources of this country. He also found time to investigate certain interesting groups of fungi, particularly those found, like truffles, buried in the soil.

The roster of his scientific interests would not be complete without mention of his work on the genetics of the various species of tobacco. This was an excellent pioneer effort which has been continued by later workers.

His investigations on the algae of the Pacific coast constitute his chief contribution to science. All who may labor in this field will acknowledge a great debt of gratitude for his pioneer work which laid such a secure foundation for future research.

He was elected a member of the American Philosophical Society in 1919.

W. J. V. OSTERHOUT

### AUREL STEIN

(1862-1943)

It was in the year 1900 that opportunity came at last, and rather suddenly, to a not very important and no longer very young official of the Indian Educational Service who had long been indulging his passion for poking and peering in out-of-the-way places by spending all his available time along the Afghan frontier and in Kashmir on what he termed "antiquarian researches." Aurel Stein had been born in Budapest and educated in Hungary, Austria, Germany, and England, with the result that he was sufficiently equipped in Oriental (and particularly Indian) languages to appreciate the extreme importance of the sporadic finds of Buddhist texts written on birchbark in a surprising variety of early Indian scripts and tongues, which had been coming out of Khotan on the edge of the Taklamakan desert in Chinese Turkistan. Sven Hedin had passed that way in 1895-96; and a year later some of the material collected in the same region by the unlucky French explorer T. L. Dutreuil de Rhins, who had been murdered in Tibet in 1894, seems to have reached India. Khotan lies close to Kashmir (though

on the further side of tremendous mountains); and the "Inspector-General of Education for the Northwest Frontier Province and Baluchistan" was accordingly both permitted and encouraged by his government to travel to Khotan in order to investigate the source of these peculiar, partly suspect, but for the most part highly Indian, antiquities from the borderland of China. So Aurel Stein came to the Tarim Basin and searched out the sand-buried cities which were to make his name famous throughout the world.

Never so happy as while riding and camping in bleak and wild and empty regions without taint of European amenities, Aurel Stein spent his fifties and sixties in the official interests of the Indian Archaeological Survey by deliberately seeking the most remote and forbidding surroundings. Central Asia saw him again on protracted visits between 1913 and 1916; much of 1926-28 was passed in Upper Swat, Baluchistan, and Makran; two years later he envisaged and even commenced a great archaeological scouting foray into Hsin-Chiang and Inner Mongolia. But by this time Chinese officialdom had seemingly become suspicious of the traveler who always took a surveyor and expert mapmaker with him and only cared for the unknown places, so that China henceforth became closed to the quondam Indian civil-servant. Undeterred, with the east barred, he turned his energies westward: his seventieth birthday found him on an "archaeological reconnaissance" which between 1931 and 1933 covered 2400 miles and took him from the northwest frontier of India to the Persian Gulf and thence through southeastern Iran. Still more remarkably, in his seventy-fifth year he rode horseback diagonally northwest through the Persian mountainlands on an intricate route which put more than a thousand miles between Shiraz east of the Persian Gulf and Tabriz west of the Caspian Sea. As usual, he was photographing, mapmaking, sporadically digging, and ubiquitously collecting sherds and similar antiquities.

What he saw and found was never lost or allowed to be forgotten. He wrote up his expeditions voluminously, published his finds sumptuously, exhibited at the British Museum, handed over his material to experts, and was singularly content to let them instruct him on their significance. For he never arrogated to himself archaeological or philological omniscience.

In strict accuracy and without unkindness it could be said that he was a topographer rather than a geographer and an antiquary

rather than an archaeologist. He never learned or applied the scientific technique of modern excavation, but was prone to impress inexpert local labor for exploratory trenches *in medias res* and to gather a superficial booty before moving on to the next site. He was himself thoroughly aware of the vast disproportion between the great areas which he covered and the brief time he was able to devote to their exploration. But he looked upon himself as an explorer and on his work as reconnoitering, precursor to the professional diggers and elaborate campaigns that would some day follow in his tracks with the aid of the maps which he caused to be made wherever he went. After an expedition he usually retired to his beloved mountain-camp in Kashmir to write up his experiences and assemble his antiquarian and topographical results, trusting in latter years to far-away devoted helpers to sort his finds and often to arrange for their printed reproduction. His public was large and his own literary energy unflagging.

Sir Aurel Stein seldom visited America; but he had lectured at Harvard and was an honorary fellow of the Fogg Art Museum. The American Philosophical Society elected him to foreign membership in 1939. He died on October 26, 1943, just a month before his 81st birthday.

RHYS CARPENTER



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